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2022 North Batch LHE

Draft

Land Health Evaluation Report

Flying Butte Allotment No. 06074

Manilla Wash Allotment No. 06017

Marcou Mesa Allotment No. 06127

Marcou Mesa East Allotment No. 01695

Mesa Wash Allotment No. 06172

Pipeline Allotment No. 06149

June 30, 2022



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List of Acronyms

ADWR	Arizona Department of Water Resources
AZGFD	Arizona Game and Fish Department
AUM	Animal Unit Month
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
ESD	Ecological Site Description
°F	Degrees Fahrenheit
FEIS	Final Environmental Impact Statement
GPS	Global positioning system
HCPC	Historic climax plant communities
HUC	Hydrologic unit code
IPaC	Information for Planning and Conservation system
LHE	Land health evaluation
MLRA	Major Land Resource Area
NAD	North American Datum
NRCS	National Resources Conservation Service
OHV	Off Highway Vehicle
p.z.	Precipitation zone
PRISM	Parameter-elevation Relationships on Independent Slopes Model
RMP	Resource Management Plan
ROD	Record of Decision
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

1.0 Introduction

The purpose of this land health evaluation (LHE) report is to determine whether the Arizona Standards for Rangeland Health are being achieved on the following allotments: Flying Butte Allotment No. 06074, Manila Wash Allotment No. 06017, Marcou Mesa Allotment No. 06127, Marcou Mesa East Allotment No. 01695, Mesa Wash Allotment No. 06172 and Pipeline Allotment No. 06149, or if the standards are not being achieved, to determine if livestock is the causal factor for not achieving or making significant progress towards achieving land health standards. This evaluation is not a decision document but a stand-alone report that clearly records the analysis and interpretation of the available inventory and monitoring data. Note for the purpose of the LHE these allotments will be referred to as the “Evaluation Area” from here on out when appropriate. The allotments will be specifically referred to when addressing Standards for Rangeland Health.

The Secretary of the Interior approved the Bureau of Land Management (BLM) Arizona Standards for Rangeland Health and Guidelines for Grazing Administration (Arizona Standards and Guidelines) in 1997. Signed by the Arizona BLM State Director, the Arizona Standards and Guidelines provide for full implementation of the Standards and Guidelines in Arizona BLM land use plans (LUP). Standards and guidelines are implemented by the BLM through terms and conditions of grazing permits, leases, and other authorizations, grazing-related portions of activity plans (including Allotment Management Plans), and through range improvement-related activities.

Land health standards are measurable and attainable goals for the desired condition of the biological resources and physical components/characteristics of desert ecosystems found within the allotment.

The LHE report ascertains:

1. If standards for rangeland health are being achieved, not achieved, or if significant progress is being made towards achievement of land health standards
2. Whether livestock grazing is a significant causal factor where it is determined that land health standards are not being achieved.

This report covers an evaluation period of 10 years (2012 – 2021). This is a standard evaluation period that provides the BLM the ability to collect an adequate amount of information related to grazing use and environmental factors pertaining to the permit renewal process.

1.1 Consultation, Cooperation, and Coordination

A letter to interested publics informing that the Allotments within the Evaluation Area were being considered for permit renewal was distributed via certified mail December 29, 2021. Additional consultation, cooperation, and coordination occurred through data on special status species being obtained from the U.S. Fish and Wildlife Service (USFWS) and the Arizona Game and Fish Department (AZGFD).

1.2 Definition of Arizona Standards for Rangeland Health and Guidelines for Grazing Administration

The Arizona standards for rangeland health are expressions of levels of physical and biological condition or degree of function required for healthy, sustainable rangelands and defines minimum resource conditions that must be achieved and maintained. Determination of rangeland health is based upon conformance with these standards. Guidelines for grazing administration consider the type and level of grazing use. Guidelines for grazing management are types of methods and practices determined to be appropriate to ensure the standards. Guidelines are tools that help managers and lessees achieve standards. Although the process of developing standards and guidelines applies to grazing administration, present rangeland health is the result of the interaction of many factors in addition to grazing livestock. Other contributing factors may include, but are not limited to past land uses, land use restrictions, recreation, wildlife, rights of way, wild horses and burros, mining, fire, weather, and insects and disease (Arizona Standards and Guidelines, 1997). The Arizona Standards and Guidelines identify three standards regarding (1) upland sites, (2) riparian-wetland sites, and (3) desired resource conditions based on specific indicators, as discussed in [Section 4.0 Rangeland Inventory and Monitoring Methodology](#) of this document.

2.0 Profile and General Description of Evaluation Area

2.1 Location

The Evaluation area includes public land North of Joseph City, Arizona and Holbrook, Arizona all the way up to the Navajo Reservation. The evaluation area is comprised of six BLM grazing allotments as shown in [Appendix A.1: Evaluation Area Map](#).

2.2 Physical Description

A physical description of the Evaluation Area follows:

2.2.1 Surface Land Ownership

The Evaluation Area is comprised predominately of private land intermixed with State Trust lands and BLM-administered lands. BLM has the smallest amount of land ownership within the area, [Table 1: Land Ownership within Evaluation Area](#) below provides the land ownership status along with the break down for each allotment within the Evaluation Area.

Table 1: Land Ownership within Evaluation Area

Land Ownership Within the Evaluation Area				
Allotment Name	Private	State Trust	BLM	Total Acres
Flying Butte	36,233	7,506	6,159	49,898
Marcou Mesa East	6,101	1,513	1,196	8,810
Marcou Mesa	20,080	8,074	4,218	32,372
Manilla Wash	1,964	1,293	353	3,610
Mesa Wash	4,027	665	436	5,128
Pipeline	4,999	4,456	931	10,386
Total	73,404	23,507	13,293	110,185

Source: BLM GIS data set

2.2.2 Precipitation

Precipitation data from PRISM climate datasets (PRISM 2021) were summarized by selecting a central point that is representative of the Evaluation Area. The data summarized includes annual precipitation along with minimum, maximum, and avg temperatures for each year. The precipitation data included for the Evaluation Area is for the years 2011-2020. The data was based off the following location:

- Latitude: 35.0767
- Longitude: -110.2181
- Elevation: 5,535 ft.

Climatic data from this source is not collected from a single station but is modeled using data from stations and physiographic factors in the area.

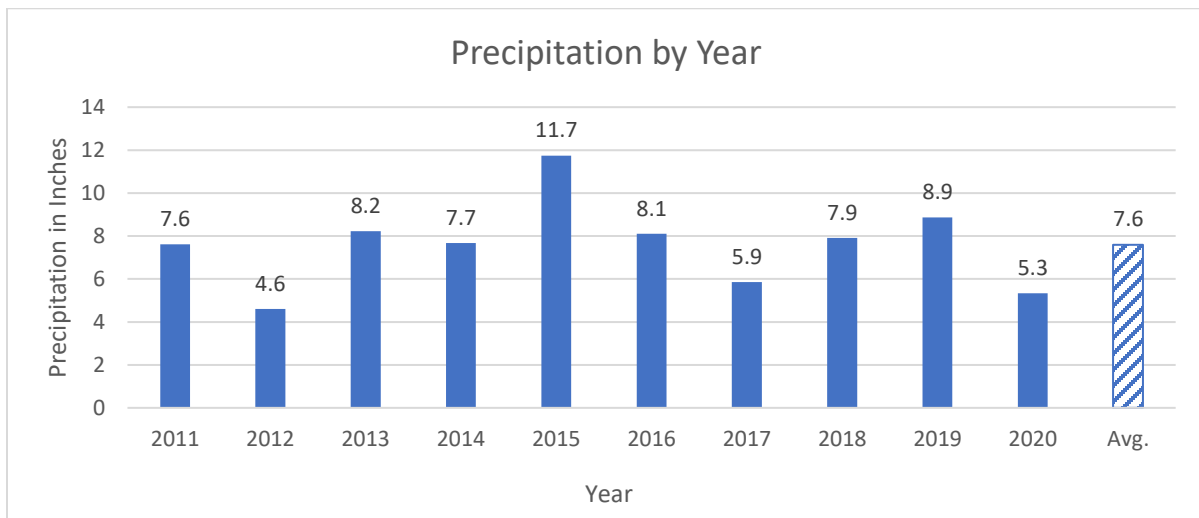


Figure 1: Precipitation by Year

Source: Prism 2021

2.2.3 Temperatures

The following, [Table 2: Temperature by Year](#) represents the typical minimum, maximum, and average temperature within the Evaluation Area between 2011-2020.

Table 2: Temperature by Year

Year	Minimum (°F)	Maximum (°F)	Average (°F)
2011	38.6	69	53.8
2012	39.9	72.5	56.2
2013	38.6	69	53.8
2014	40.1	71.8	55.9
2015	40.5	70.8	55.7
2016	39.2	71.9	55.5
2017	40.5	73.1	56.8
2018	40.4	72.2	56.3
2019	39.2	69.2	54.2
2020	39.9	72.3	56.1

Source: Prism 2021

2.2.4 Soils

The soil composition of the Evaluation Area is presented in [Table 3: Soil Composition in Evaluation Area and Appendix A. 2: Soils within Evaluation Area](#). The table breaks down total soil composition for the entire Evaluation Area as well as soil composition on BLM-administered lands. For the purposes of this LHE soil descriptions are provided only for soil units that fall on BLM-administered land.

Table 3: Soil Composition in Evaluation Area

Soil Map Unit Name	Evaluation Area Acres	Total Composition	BLM Acres	BLM Composition
Grieta family, 3 to 10 percent slopes	1	0.0%	0	0
Torriorthents-Typic Haplocalcids association, 20 to 60 percent slopes	3	0.0%	0	0
Claysprings family, 1 to 10 percent slopes	5	0.0%	4	0
Ives fine sandy loam, wet, 0 to 1 percent slopes	5	0.0%	0	0
Grieta sandy loam, 1 to 3 percent slopes	8	0.0%	0	0
Borrow pits	10	0.0%	0	0
Navajo silty clay, wet, 0 to 1 percent slopes	15	0.0%	0	0
Ives sandy loam, saline-sodic, 1 to 3 percent slopes	36	0.0%	16	0.1%
Ives very fine sandy loam, saline-sodic, 0 to 1 percent slopes	42	0.0%	0	0
Tours silty clay loam, saline-sodic, 0 to 1 percent slopes	47	0.0%	29	0.2%
Rock outcrop-Epikom complex, 20 to 60 percent slopes	82	0.1%	78	1%
Tours clay loam, 1 to 3 percent slopes	90	0.1%	0	0
Jocity silty clay, saline-sodic, 0 to 1 percent slopes	103	0.1%	0	0
Dune land	134	0.1%	0	0
Trail loamy sand, 0 to 3 percent slopes	166	0.2%	0	0
Jocity sandy clay loam, saline-sodic, 0 to 1 percent slopes	223	0.2%	0	0
Purgatory fine sandy loam, 1 to 8 percent slopes	510	0.5%	108	1%
Epikom channery sandy loam, 1 to 12 percent slopes	522	0.5%	0	0
Navajo silty clay, saline-sodic, 0 to 1 percent slopes	644	0.6%	0	0
Tours silty clay loam, saline-sodic, 1 to 3 percent slopes	703	0.6%	0	0
Gypsiorthids-Torriorthents association, 5 to 60 percent slopes	717	0.7%	239	2%
Epikom-Rock outcrop complex, 1 to 20 percent slopes	979	0.9%	0	0
Sheppard loamy sand, 1 to 12 percent slopes	1306	1.2%	14	0.1%

Penzance-Grieta complex, 0 to 5 percent slopes	1528	1.4%	101	1%
Kinan loamy sand, 1 to 5 percent slopes	1675	1.5%	71	1%
Riverwash-Typic Torrifluvents complex, 0 to 5 percent slopes	2154	2.0%	248	2%
Calciorthids-Torriorthents-Rock outcrop complex, 15 to 80 percent slopes	2306	2.1%	290	2%
Navajo silty clay, saline-sodic, 1 to 3 percent slopes	3516	3.2%	147	1%
Burnswick-Marcou complex, 1 to 5 percent slopes	6116	5.6%	1078	8%
Jocity sandy clay loam, saline-sodic, 1 to 3 percent slopes	6433	5.8%	613	5%
Torriorthents-Typic Calciorthids association, 20 to 60 percent slopes	6953	6.3%	725	5%
Marcou loamy sand, 1 to 8 percent slopes	7411	6.7%	1244	9%
Grieta sandy loam, 3 to 10 percent slopes	7869	7.1%	96	1%
Sheppard-Grieta complex, 1 to 12 percent slopes	7930	7.2%	18	0%
Claysprings clay, 1 to 10 percent slopes	9355	8.5%	1755	13%
Burnswick sandy clay loam, 1 to 5 percent slopes	18756	17.0%	2148	16%
Badland-Torriorthents association, 1 to 30 percent slopes	21858	19.8%	4273	32%

Source: USDA NRCS, 2020

The following soil descriptions occur on BLM-administered land and include at least 100 acres, the soils not described are a minor component and are not as common within the BLM-administered land within the Evaluation Area.

Purgatory fine sandy loam, 1 to 8 percent slopes:

This soil type occurs in elevations ranging from 4,800 to 5,500 feet and receives on average 8 to 10 inches of precipitation annually. The mean annual air temperature is 53°F to 56°F, with a frost-free period of 150 to 180 days. The soil occurs on plateaus near the summit with slopes ranging from 1 to 8 percent, parent material originates from Gypsiferous eolian sands and/or Gypsiferous alluvium derived from mudstone and/or sandstone. The soil is well drained with a depth of 20 to 40 inches to restrictive layer.

Gypsiorthids-Torriorthents association, 5 to 60 percent slopes

This soil type occurs in elevations ranging from 4,800 to 5,500 feet and receives on average 8 to 10 inches of precipitation annually. The mean annual air temperature is 53°F to 56°F, with a frost-free period of 150 to 180 days. The soil occurs on hills around the summit, backslope, or shoulder, slopes range from 5 to 60 percent, with parent material originating from mixed alluvium. The soil is well drained with a depth of 80 inches or more to the restrictive area.

Penzance-Grieta complex, 0 to 5 percent slopes

This soil type occurs in elevations ranging from 4,800 to 5,500 feet and receives on average 8 to 10 inches of precipitation annually. The mean annual air temperature is 53°F to 56°F, with a frost-free period of 150 to 180 days. The soil occurs on fan terraces on plateaus, slopes range from 0 to 5 percent with parent material originating from alluvium derived from mudstone and/or sandstone. The soil is well drained with a depth of 80 inches or more to the restrictive area.

Riverwash-Typic Torrifluents complex, - 0 to 5 percent slopes

This soil type occurs in elevations ranging from 4,800 to 5,500 feet and receives on average 8 to 10 inches of precipitation annually. The mean annual air temperature is 53°F to 56°F, with a frost-free period of 150 to 180 days. The soil occurs on drainageways, slopes range from 0 to 5 percent slopes with parent material originating from mixed alluvium. The soil is well drained with a depth of 0 to 60 inches to the restrictive layer.

Calciorthids-Torriorthents-Rock outcrop complex, 15 to 80 percent slopes

This soil type occurs in elevations ranging from 4,800 to 5,500 feet and receives on average 8 to 10 inches of precipitation annually. The mean annual air temperature is 53°F to 56°F, with a frost-free period of 150 to 180 days. The soil occurs on dikes, plug domes, and buttes, slopes range from 15 to 80 percent with parent material originating from mixed alluvium and/or colluvium derived from volcanic and sedimentary rock. The soil is well drained and with a depth of 10 to 50 inches to the restrictive layer.

Navajo silty clay, saline-sodic, 1 to 3 percent slopes

This soil type occurs in elevations ranging from 4,800 to 5,500 feet and receives on average 8 to 10 inches of precipitation annually. The mean annual air temperature is 53°F to 56°F, with a

frost-free period of 150 to 180 days. The soil occurs on alluvial fans, and flood plains, slopes range from 1 to 3 percent with parent material originating from mixed alluvium derived from volcanic and sedimentary rock. The soil is well drained with a depth of 80 or more inches to restrictive layer.

Burnswick-Marcou complex, 1 to 5 percent slopes

This soil type occurs in elevations ranging from 4,800 to 5,500 feet and receives on average 8 to 10 inches of precipitation annually. The mean annual air temperature is 53°F to 56°F, with a frost-free period of 150 to 180 days. The soil occurs on fan terraces, slopes range from 1 to 5 percent with parent material originating from mixed alluvium derived from sandstone and siltstone and/or mudstone. The soils are well drained with a depth of 80 or more inches to the restrictive layer.

Jocity sandy clay loam, saline-sodic, 1 to 3 percent slopes

This soil type occurs in elevations ranging from 4,800 to 5,500 feet and receives on average 8 to 10 inches of precipitation annually. The mean annual air temperature is 53°F to 56°F, with a frost-free period of 150 to 180 days. The soil occurs on alluvial fans, slopes range from 1 to 3 percent with parent material originating from mixed alluvium derived from volcanic and sedimentary rock. The soils are well drained with a depth of 80 or more inches to the restrictive layer.

Torriorthents-Typic Calciorthids association, 20 to 60 percent slopes

This soil type occurs in elevations ranging from 4,800 to 5,500 feet and receives on average 8 to 10 inches of precipitation annually. The mean annual air temperature is 53°F to 56°F, with a frost-free period of 150 to 180 days. The soil occurs on mesas, slopes range from 20 to 60 percent with parent material originating from mixed alluvium and or colluvium. The soils are well drained with a depth of 80 or more inches to the restrictive layer.

Marcou loamy sand, 1 to 8 percent slopes

This soil type occurs in elevation ranging from 4,800 to 5,500 feet and receives on average 8 to 10 inches of precipitation annually. The mean annual air temperature is 53°F to 56°F, with a frost-free period of 150 to 180 days. The soil occurs on dunes, slopes range from 1 to 8 percent with parent material originating from eolian sands over mixed alluvium. The soils are somewhat excessively drained with a depth of 80 or more inches to the restrictive layer.

Claysprings clay, 1 to 10 percent slopes

This soil type occurs in elevations ranging from 4,800 to 5,500 feet and receives on average 8 to 10 inches of precipitation annually. The mean annual air temperature is 53°F to 56°F, with a frost-free period of 150 to 180 days. The soil occurs on plateaus, slopes range from 1 to 10 percent with parent material originating from mixed alluvium derived from shale and siltstone and/or mudstone. The soils are well drained with a depth of 6 to 20 inches to the restrictive layer.

Burnswick sandy clay loam, 1 to 5 percent slopes

This soil type occurs in elevations ranging from 4,800 to 5,500 feet and receives on average 8 to 10 inches of precipitation annually. The mean annual air temperature is 53°F to 56°F, with a frost-free period of 150 to 180 days. The soil occurs on fan terraces, slopes range from 1 to 5 percent with parent material originating from alluvium derived from mudstone and/or sandstone. The soils are well drained with a depth of 80 or more inches to the restrictive layer.

Badland-Torriorthents association, 1 to 30 percent slopes

This soil type occurs in elevations ranging from 4,800 to 5,500 feet and receives on average 8 to 10 inches of precipitation annually. The mean annual air temperature is 53°F to 56°F, with a frost-free period of 150 to 180 days. The soil occurs on hills and escarpments, slopes range from 1 to 30 percent with parent material originating from mixed alluvium and/or colluvium. The soils are excessively drained with a depth of 5 to 20 inches to the restrictive layer.

2.2.5 Watershed

The Evaluation Area identified in this LHE are located within the Little Colorado River Plateau Basin, Hydrologic Unit Code (HUC) 150200 and within the physiographic province of the Colorado Plateau Uplands. The Little Colorado Basin has a drainage area of approximately 26,972 square miles from which average annual flows of 267,000 acre-feet (measured at USGS 09402300) enter the main stem of the Colorado River near Desert View, AZ. Of the 110,185 total acres comprising the Evaluation Area, the BLM manages 13,293 acres or approximately 12%.

Approximately 370 total miles of surface drainages occur within the Evaluation Area, and 50 miles or 13% are on BLM-administered lands within the allotments. Nearly all these surface water inputs to the Little Colorado River are intermittent or ephemeral drainages that are known to have flashy responses to temporally variable annual precipitation. The 10-year average total annual precipitation is approximately 7.6 inches and the bulk of that comes during the monsoon season, July through September. The summer monsoon regime contributes 35%-45% of the annual rainfall across the desert Southwest (Nolin and Hall-McKim, 2006).

This is an important area for recharge of ground water resources in the Little Colorado River Plateau basin. Most of the Eastern Plateau is underlain by Mesozoic to Paleozoic sedimentary and volcanic rock that form the regional aquifers including the largest three, the C-, D-, and N-aquifers. The estimated natural recharge of the C-, D-, and N-aquifers are 319,000, 5400, and 2600 to 20200 acre-feet, respectively (ADWR, 2010). As such, the Arizona Department of Water Resources (ADWR) has identified an area of special attention, the Irrigation Non-expansion Area (INA) of Joseph City. INAs were created to help bolster assured and adequate water supplies by limiting new irrigation uses within the management areas. This INA encompasses portions of the Marcou Mesa, Manilla Wash, and Mesa Wash Allotments. No prime farmland exists in the project area.

The BLM has ground water rights filed with ADWR in 10 sections totaling 531.73 acre-feet for annual use for stock water and wildlife. Typically, both uses are listed in the respective water right for each individual surface water feature. The BLM does not have any groundwater wells in the project area, see [*Table 4: Surface Water Resources in Acre-Feet in the Project Area.*](#)

Intermittent or nearly perennial surface water resources such as seeps and springs occur rarely in this region. One notable spring system is located on the Mesa Wash Allotment, east of the Pen-Rob Landfill. Most of this spring complex is situated on private land and its primary source is known as Joseph City Spring. Three presumed seeps, all west of this complex, were individually located and assessed in the spring of 2021. Although some riparian characteristics were found at each of these three locations, they all lack the extended periods of freely available water in the soil required to produce and maintain riparian vegetation communities, support riparian-wetland functions, or provide riparian-wetland values. The proper functioning condition protocol is not appropriate for systems such as these and Standard 2 does not apply. The BLM has no water rights associated with any of these three seep/springs.

2.2.6 Range Improvements

Only range improvements on BLM-administered land are considered for this evaluation. See [Appendix A. 4 Range Improvements on BLM Land](#) for a map showing range improvements located on BLM-administered lands within the Evaluation Area.

Table 4: Surface Water Resources in Acre-Feet in the Project Area

Allotment	Stock (ac-ft)	Wildlife (ac-ft)	Annual Use (ac-ft)	Total (ac-ft)
Marcou Mesa	0	0	116.76	116.76
Marcou Mesa East	0	0	0	0
Manilla Wash	0	0	0	0
Mesa Wash	0.03	0.03	0	0.06
Flying Butte	8.96	0	404.45	413.41
Pipeline	0.27	0.3	1.2	1.5

Source: ADWR, Accessed 2022

2.3 Biological Resources

This section discusses the biological resources within the Evaluation Area

2.3.1 Major Land Resource Area

A Major Land Resource Area (MLRA) is a broad geographic area characterized by a particular pattern of soils, climate, water resources, vegetation, and land use. Each MLRA in which rangeland and forest land occur is divided into sub-resource areas, and further divided into ecological sites. The Evaluation Area is located in the Colorado Plateau MLRA 35 and lies within the Shrub-Grasslands 35-2 sub resource area (EDIT, N.d.).

2.3.2 Ecological Sites

Ecological sites provide a consistent framework for classifying and describing rangeland soils and vegetation thereby delineating land units that share similar capabilities to respond to management activities or disturbance. Ecological Site Descriptions (ESD) are developed by the

National Resources Conservation Service (NRCS) and partners to document the properties of ecological sites. These include climate, soil, geomorphology, hydrology, and vegetation information that describe the behavior of individual ecological sites. Since an ecological site might feature several plant communities that occur over time or in response to land management, these descriptions can be used to interpret ecological changes (Perez 2017).

There are a total of thirteen ecological sites that occur within the Evaluation Area, nine of these ecological sites occur on BLM-administered land. Monitoring was conducted on six of the nine ecological sites that occur on BLM-administered land; the ecological sites that monitoring occurred on will be further described below. Detailed NRCS reports for each ESD are stored and accessed within the Ecosystem Dynamics Interpretive Tool (EDIT) available online at <https://edit.jornada.nmsu.edu/>. The ESD reference sheets are considered provisional, meaning the ecological site has undergone quality control and quality assurance, and it contains a working state and transition model with enough information to identify the ecological site.

A key attribute of an ecological site is the historic climax plant community (HCPC), or reference state. The HCPC represents the natural potential plant community found on relatively undisturbed sites. The HCPC or reference state is often compared with existing range conditions to determine current land health. Soils, topography, and climate are the factors that collectively form the basis for the classification of rangeland ecological sites.

[*Appendix A. 5: Ecological Sites with Key Areas*](#) shows the ecological sites occurring within BLM-administered lands, and [*Table 5: Ecological Sites on BLM-administered Land*](#) below shows the breakdown of the ecological sites. State and Transitions models for each ecological site can be found in [*Appendix B: State and Transition Models*](#)

Table 5: Ecological Sites on BLM-administered Land

Ecological Site	Acres on BLM	Total BLM Composition
Sandy Upland 6-10' p.z.	31	0%
Sandstone/Shale Upland 6-10 p.z.	77	1%
Clay Loam Upland 6-10" p.z. Saline	101	1%
Loamy Upland 6-10" p.z. Gypsic	108	1%
Sandy Loam Upland 6-10" p.z.	167	1%
Sandy Wash 6-10" p.z.	248	2%
Loamy Wash 6-10' Saline-Sodic	804	6%
Sandy Upland 6-10' p.z.	1,244	9%
Mudstone/Sandstone Hills 6-10" p.z.	1,254	9%
Clay Loam Terrace 6-10" p.z. Sodic	3,226	24%
Shale Upland 6-10" p.z.	6,032	45%
Total Acres	13,293	100%

USDA-NRCS, 2020

Clay Loam Terrace 6-10" p.z. Sodic (R035XB237AZ)

This ecological site occurs in Common Resource Area 35.2 – the Colorado Plateau Shrub-Grasslands. Elevations range from 3,800-5,800 feet and precipitation averages 6-10 inches per year. Vegetation includes shadscale, fourwing saltbush, Mormon tea, blackbrush, Indian ricegrass, galleta, blue grama, and black grama. The site occurs on fan remnants, low stream terraces, and swales of valley floors below mesas and cuevas. The climate is very dry and windy with hot temperatures in the summer and cold temperatures in the winter, a slight majority of the precipitation arrives during the late fall, winter, and early spring. (EDIT, 2007)

Loamy Wash 6-10" p.z. Saline-Sodic (R035XB211AZ)

This ecological site occurs in Common Resource Area 35.2 – the Colorado Plateau Shrub-Grasslands. Elevations range from 3,800-5,800 and precipitation averages 6 to 10 inches per year. Vegetation includes shadscale, fourwing saltbush, Mormon tea, blackbrush, Indian ricegrass, galleta, blue grama and black grama. The site is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys, and deep canyons. The

ecological site occurs in the drainage or bottom positions on the landscape. The climate is very dry and windy with hot temperatures in the summer and cold temperatures in the winter, a slight majority of the precipitation arrives during the late fall, winter, and early spring. (EDIT, 2011)

Mudstone/Sandstone Hills 6-10” p.z. (R035XB201AZ)

This ecological site occurs in Common Resource Area 35.2 – the Colorado Plateau Shrub-Grasslands. Elevations range from 3,800-5,800 feet and precipitation averages 6-10 inches per year. Vegetation includes shadscale, fourwing saltbush, Mormon tea, black brush, Indian ricegrass, galleta, blue grama, and black grama. The site is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys, and deep canyons. The ecological site occurs on bedrock-controlled hillsides and mesa escarpments with slopes ranging from 15 to 60 percent. The climate is very dry and windy with hot temperatures in the summer and cold temperatures in the winter, a slight majority of the precipitation arrives during the late fall, winter, and early spring. (EDIT, 2008)

Sandy Loam Upland 6-10” p.z. (R035XB219AZ)

This ecological site occurs in Common Resource Area 35.2 – the Colorado Plateau Shrub-Grasslands. Elevations range from 3,800-5,800 and precipitation averages 6 to 10 inches per year. Vegetation includes shadscale, fourwing saltbush, Mormon tea, blackbrush, Indian ricegrass, galleta, blue grama and black grama. The site is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons, and occurs in an upland position. The climate is very dry and windy with hot temperatures in the summer and cold temperatures in the winter, a slight majority of the precipitation arrives during the late fall, winter, and early spring. (EDIT, 2011)

Sandy Upland 6-10” p.z. Sodic

This ecological site occurs in Common Resource Area 35.2 – the Colorado Plateau Shrub-Grasslands. Elevations range from 3,800-5,800 and precipitation averages 6 to 10 inches per year. Vegetation includes shadscale, fourwing saltbush, Mormon tea, blackbrush, Indian ricegrass, galleta, blue grama and black grama. The site is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons, and occurs in an upland position. The climate is very dry and windy with hot temperatures in the summer and cold temperatures in the winter, a slight majority of the precipitation arrives during the late fall, winter, and early spring. (EDIT, 2010)

Shale Upland 6-10’ p.z. (R035XB220AZ)

This ecological site occurs in Common Resource Area 35.2 – the Colorado Plateau Shrub-Grasslands. Elevations range from 3,800-5,800 feet and precipitation averages 6 to 10 inches per year. Vegetation includes shadscale, fourwing saltbush, Mormon tea, blackbrush, Indian ricegrass, galleta, blue grama, and black grama. The site is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys, and deep canyons. The ecological site occurs on gently sloping plains, plateaus, or fan remnants. Slopes generally range from 0 to 15 percent but can reach up to 25 percent for short distances. The climate is very dry

and windy with hot temperatures in the summer and cold temperatures in the winter, a slight majority of the precipitation arrives during the late fall, winter, and early spring. (EDIT, 2012)

2.3.3 Special Status Species

This section discusses the wildlife resources in and around the six allotments addressed in this LHE, including threatened and endangered species, BLM special status species, and species of economic and recreational importance. Refer to [Appendix E: Special Status Species, Threatened and Endangered Species, General Wildlife](#) for a list of species.

2.3.3.1 Wildlife Resources

Threatened and Endangered species

The grazing program for the BLM Gila District, including grazing activities within the allotments, was assessed pursuant to Section 7 of the Endangered Species Act (ESA) to determine whether the program would jeopardize the continued existence of an endangered or threatened species and/or their designated or proposed critical habitat. The USFWS rendered a Biological Opinion (BO) on the Gila District Livestock Grazing Program #22410-2006-F-0414 (2012).

A query conducted on May 05, 2022, of the USFWS Information for Planning and Conservation (IPaC; USDI USFWS N.d.) website identified a total of eight species listed as threatened, endangered, or candidate species for consideration within the Evaluation Area (Appendix A): California condor; Yellow-billed cuckoo; Northern Mexican gartersnake; Little Colorado spinedace; Zuni bluehead sucker; (Mexican) gray wolf, Peebles Navajo cactus; and monarch. A report generated on May 09, 2022 from the AZGFD Environmental Online Review Tool and Heritage Data Management System (AZGFD N.d.) indicated that there was two additional Federally listed or candidate species with the potential to occur within five miles of the Evaluation Area boundary and/or within the allotments; Little Colorado sucker (hybrid – candidate conservation agreement) and Black-footed ferret. A complete list of these species and information on their life histories and habitat is in Appendix A.

The IPaC query indicated the gray wolf as being potentially present within the Evaluation Area; however, Mexican wolf is the correct common name of *Canis lupus baileyi* and will be referred to as Mexican wolf in this document. This species requires areas with sufficient prey populations, such as deer and elk, and where human-induced mortality is controlled. Current populations are typically associated with evergreen pine-oak woodlands, pinyon juniper woodlands, and mixed-conifer montane forests. The Mexican Wolf Experimental Population Area encompasses Arizona and New Mexico from Interstate 40 south to Mexico. Based on the most current information, species occurrence in Arizona is primarily on eastern/northeastern portions of the Apache-Sitgreaves National Forest, eastern portions of the San Carlos Apache Reservation, and eastern portions of the Fort Apache Indian Reservation according to the Mexican Wolf Recovery Program Monthly Update from January 2020 (MWIFT 2020). Due to the absence of forested habitat on the BLM-administered portions of the Evaluation Area Mexican gray wolves are expected to be absent within the jurisdiction of the BLM. Overall, the BLM-administered portions of the Evaluation Area lack suitable forested habitat to support

Mexican gray wolves but is located within a Mexican wolf experimental population area and may be used by wolves for movement between blocks of suitable habitat.

Western populations of the monarch butterfly undergo long-distance migration to the California coast and Baja California to use forest groves sheltered from winds for overwintering and diapause (Southwest Monarch Study Inc. 2018; Leong et al. 1995; Van Hook 1996) On return to Arizona, females' oviposition on obligate milkweed host plants which later serve as a food source for larval offspring. Adult monarchs require a diversity of blooming nectar sources along breeding and migration corridors. Monarchs and milkweed are not known to occur on the Evaluation Area. It is possible butterflies could move through the area and utilize junipers as stopover roosts, but habitat is not suitable to support the species for breeding.

The black-footed ferret is associated with native grassland communities and relies solely on prairie dog burrows for shelter and suitable dens to raise their young (USDI USFWS 2017). They are highly specialized predators that rely on prairie dogs for survival, which make up more than 90 percent of their diet (USDI USFWS 2017). Gunnison prairie dogs were noted in the AZGFD report as having the potential to occur in this area based on predicted range models; however, no prairie dogs have been observed in the Evaluation Area. Based on the ESDs of the Evaluation Area and the results of monitoring data, as described below in Section 6, BLM-administered portions of the Evaluation Area contain suitable habitat to support this species if it was present. Due to the lack of their primary prey species and source for burrows, this species is expected to be absent from the Evaluation Area.

Peebles Navajo cactus is a species endemic to Arizona occupying a very small geographical area (7 miles in length by 1 mile in width) extending northwest to southeast within the immediate vicinity of Joseph City and Holbrook, Navajo County, Arizona (U.S. Fish and Wildlife Service 1984b). The species occupies low hills in the Plains and Great Basin Grassland biotic community from near Joseph City extending northwest to the Marcou Mesa region northwest of Holbrook (Brown and Lowe 1980, Arizona Game and Fish Department 1999). The cactus occurs between 5,100 and 5,650 feet above sea level. The cactus occurs in exposed, sunny areas in gravelly substrate derived from the Shinarump Member of the Chinle Formation, on gently sloping to flat hilltops (Stuart *et al.* 1972, Arizona Game and Fish Department 1999). Peebles Navajo cactus prefers soil conditions consisting of pale yellow to yellow-orange fine to coarse-grained friable sandstone (Stuart *et al.* 1972). Pebbles of quartz, quartzite, and chert are also commonly associated with the species (Arizona Game and Fish Department 1999). Peebles Navajo cactus has been confirmed and is monitored yearly by the BLM through protocol surveys on the Pipeline Allotment within the Tanner Wash Area of Critical Environmental Concern (ACEC). Suitable habitat for the species exists on the other five allotments, though the species has not been documented on those allotments.

BLM Special Status Species

The BLM current list of sensitive species that have suitable habitat present and are known to exist or have the potential to exist within the Evaluation Area are listed in [*Appendix E: Special Status Species, Threatened and Endangered Species, General Wildlife.*](#)

The Arizona Game and Fish Environmental Review Tool incorporates data from the USFWS Birds of Conservation Concern and Heritage Data Management System is incorporated to generate a list of known occurrences of special status species included birds covered under the Migratory Bird Treaty Act and Birds of Conservation Concern.

Migratory and BLM Sensitive bird species utilize the grassland, open shrub, and cliff habitat for foraging, roosting and/or hunting prey. BLM Sensitive, and general, bat species may occur on the Evaluation Area if roosting habitat is available in rock crevices. Generally, the composition, structure, and distribution of habitat for both classifications of sensitive species are intact and would be suitable for use if the species were present.

General Wildlife and Species of Economic and Recreational Importance

Game species predicted to occur within Evaluation Area include America pronghorn, elk, mountain lion, mule deer, and mourning dove (AZGFD N.d.). Scaled quail are regularly reported near Holbrook; thus, this species was added to the analysis. Mountain lions are generalists that can be found in deserts, mountains, deciduous forests, lowlands, canyons, prairies and savannahs, and may use the Evaluation Area to migrate between more suitable patches of habitat, such as rocky outcrops or areas with dense vegetation. Grasslands with dispersed shrub thickets, cacti and palo verde offer forage and cover habitat for pronghorn, mule deer, and mourning dove. Elk prefer mountainous pine oak mixed woodlands and open meadows depending seasonal conditions. All these species have the potential to occur in the Evaluation Area at least seasonally.

Due to the openness of the landscape and lack of year-round water, general wildlife species are expected to be dispersed sparsely across the Evaluation Area. Based on observations by BLM staff, site characteristics are suitable to support small numbers of burrowing rodents (i.e. kangaroo rats and pocket mice), coyote, lagomorphs (black-tailed jackrabbit), ungulates (i.e. mule deer), and common birds such as rock wren, killdeer, red-tailed hawk, and black-throated sparrow.

2.4 Special Management Areas

Special Management Areas that occur within the Evaluation Area includes a portion of the Tanner Wash ACEC. The Tanner Wash ACEC was specifically set aside for the endangered Peebles Navajo Cactus (*Pediacactus peeblesianus*) in the Phoenix Resource Management Plan. The ACEC includes 2,294 acres of BLM-administered land of which 640 acres fall within the Pipeline Allotment. The BLM is required to protect Peebles Navajo Cactus, currently the 640 acres of BLM-administered land is authorized for grazing, this should be further analyzed to determine what if any measures should be taken to ensure protection of the Peebles Navajo Cactus. Refer to [Appendix A. 6: Evaluation Area with ACEC](#)

2.5 Recreation Resources

Dispersed recreation activities that may occur within the Evaluation Area include small and big game hunting, target shooting, hiking, and off highway vehicle operation. BLM-administered

land is fragmented, and most recreation activities would be likely to occur on either private or State Trust Land.

2.6 Cultural Resources

Guidelines 3-7 in the Arizona Standards and Guidelines states that, “Management practices to achieve desired plant communities will consider protection and conservation of known cultural resources, including historical sites, prehistoric sites and plants of significance to Native American peoples”.

A Class I cultural review was completed on March 28, 2022, by Safford Field Office Archaeologist, George Maloof. This library records search noted that there are no known archaeological sites, properties of traditional religious or cultural importance (i.e., traditional cultural properties), or sacred sites.

3.0 Grazing Management

This section discusses the grazing history, permitted use, terms and conditions, and range improvements for the individual allotments within the Evaluation Area.

3.1 Grazing History

The allotments within the Evaluation Area consist of grazing on private land, State Trust land, and BLM-administered land. All of the allotments are authorized under Section 15 of the Taylor Grazing Act, as a Section 15 lease, there are limitations to the degree in which management actions can control or influence the overall landscape. All the allotments within the Evaluation Area have been assigned to the “Custodial” management category. Custodial allotments are typically defined as having low resource potential and contain small tracts of public lands within the allotment. Management objectives are intended to be minimal so long as excessive degradation is not observed on BLM-administered lands.

3.2 Terms and Conditions for Permitted Use

Grazing on the allotments within the Evaluation Area are in accordance with the terms and conditions of the current term lease for each allotment. *Table 6: Current Terms and Conditions* below, provides a summary of the current permitted use of each allotment.

Table 6: Current Terms and Conditions.

Allotment Name/Number	Livestock Number/Kind	Grazing period Begin - End	% Public Land	Active Use (AUM)
Flying Butte/ No. 06074	53 Cattle	3/1 - 2/28	100	636
Manila Wash/ No. 06017	5 Cattle	3/1 - 2/28	100	60
Marcou Mesa/ No. 06127	64 Cattle	3/1 - 2/28	100	768
Marcou Mesa East/ No. 01695	14 Cattle	3/1 - 2/28	100	173
Mesa Wash/ No. 06172	5 Cattle	3/1 - 2/28	100	60
Pipeline/ No. 06149	9 Cattle	3/1 - 2/28	100	108

*Animal Unit Month (AUM) or the amount of forage necessary for the sustenance of one cow or its equivalent for a period of 1 month.

Other terms and conditions specific to each allotment:

All grazing permits or leases have “Standard Terms and Conditions” that are applicable on all allotments that are managed by the BLM, additional or “Other Terms and Conditions” can be added to account for any additional conditions relevant to specific allotments. The following is a summary of the “Other Terms and Condition” associated with each allotment within the Evaluation Area.

Flying Butte:

- None

Marcou Mesa:

- None

Manila Wash:

- In order to Improve livestock distribution on the public lands, all salt blocks and/or mineral supplements will not be placed within a ¼ mile of any riparian area, wet meadow, or watering facility (either permanent or temporary) unless stipulated through a written agreement or decision in accordance with 43 CFR 4130.3-2(C).
- If in connection with allotment operations under this authorization, any human remains, funerary objects, sacred objects or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (P.L. 101-601;104 STAT. 3048; U.S.C. 3001) are discovered, the permittee/lessee shall stop operations in the Immediate area of the discovery, protect the remains and objects, and immediately notify the authorized officer of the discovery. The permittee/lessee shall continue to protect the

immediate area of discovery until notified by the authorized officer that operations may resume.

- In Accordance with 43 CFR 4130.8-1(F): Failure to pay grazing bills within 15 days of the due date specified in the bill shall result in a late fee assessment of \$25.00 or 10 percent of the grazing bill, whichever is greater, but not to exceed \$250.00. Payment made later than 15 days after the due date, shall include the appropriate late fee assessment. Failure to make payment within 30 days may be a violation of 43 CFR SEC.4140.1 (B)(1) and shall result in action by the authorized officer under 43 CFR SECs.4150.1 and 4160.1-2.

Marcou Mesa East:

- In Accordance with 43 CFR 4130.8-1(F): Failure to pay grazing bills within 15 days of the due date specified in the bill shall result in a late fee assessment of \$25.00 or 10 percent of the grazing bill, whichever is greater, but not to exceed \$250.00. Payment made later than 15 days after the due date, shall include the appropriate late fee assessment. Failure to make payment within 30 days may be a violation of 43 CFR
- If in connection with allotment operations under this authorization, any human remains, funerary objects, sacred objects or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (P.L. 101-601;104 STAT. 3048; U.S.C. 3001) are discovered, the permittee/lessee shall stop operations in the Immediate area of the discovery, protect the remains and objects, and immediately notify the authorized officer of the discovery. The permittee/lessee shall continue to protect the immediate area of discovery until notified by the authorized officer that operations may resume.
- As a term and condition of this permit you are required to submit a report of actual grazing use made on this allotment for the previous grazing period March 1 to Feb. 28. Failure to submit this report by March 1, of this year, may result in suspension or cancellations of grazing permit.
- In accordance with SEC. 325, title iii, H.R. 2691, Department of the Interior and related agencies appropriations act, 2004 (p.l. 108-108), which was enacted on November 10, 2003, this grazing permit or lease is renewed under section 402 of the Federal Land Policy and Management act of 1976, as amended (43 u.s.c. 1752), title iii of the Bankhead-Jones Farm Tenant Act (7 U.S.C. 1010 et seq.), or, if applicable, Section 510 of the California Desert Protection Act (16 U.S.C. 410aaa-50). in accordance with public law 108-108 the terms and conditions contained in the expired or transferred permit or lease AND shall continue in effect under the renewed permit or lease until such time as the secretary of the interior completes processing of this permit or lease in compliance with all applicable laws and regulations, at which time this permit or lease may be canceled, suspended, or modified, in whole or in part, to meet the requirements of such applicable laws and regulations.

- Grazing fee payment are due on the date specified on the billing notice and must be paid in full within 15 days of the due date, except as otherwise provided in the grazing permit or lease. If payment is not made within that time frame, a late fee (greater of 25\$ or 10 percent of the amount owed but not more than \$250) Will be assessed.

Mesa Wash:

- In order to Improve livestock distribution on the public lands, all salt blocks and/or mineral supplements will not be placed within a ¼ mile of any riparian area, wet meadow, or watering facility (either permanent or temporary) unless stipulated through a written agreement or decision in accordance with 43 CFR 4130.3-2(C).
- If in connection with allotment operations under this authorization, any human remains, funerary objects, sacred objects or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (P.L. 101-601;104 STAT. 3048; U.S.C. 3001) are discovered, the permittee/lessee shall stop operations in the Immediate area of the discovery, protect the remains and objects, and immediately notify the authorized officer of the discovery. The permittee/lessee shall continue to protect the immediate area of discovery until notified by the authorized officer that operations may resume.

Pipeline:

- This permit or lease is issued under the authority of Section 415, Public Law 112-74 and contains the same terms and conditions as the previous lease. This permit or lease can be canceled, suspended, or modified, in whole or in part to meet the requirements of applicable laws and regulations.
- In order to Improve livestock distribution on the public lands, all salt blocks and/or mineral supplements will not be placed within a ¼ mile of any riparian area, wet meadow, or watering facility (either permanent or temporary) unless stipulated through a written agreement or decision in accordance with 43 CFR 4130.3-2(C).
- If in connection with allotment operations under this authorization, any human remains, funerary objects, sacred objects or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (P.L. 101-601;104 STAT. 3048; U.S.C. 3001) are discovered, the permittee/lessee shall stop operations in the Immediate area of the discovery, protect the remains and objects, and immediately notify the authorized officer of the discovery. The permittee/lessee shall continue to protect the immediate area of discovery until notified by the authorized officer that operations may resume.

In accordance with SEC. 325, title iii, H.R. 2691, Department of the Interior and related agencies appropriations act, 2004 (p.l. 108-108), which was enacted on November 10, 2003, this grazing permit or lease is renewed under section 402 of the Federal Land Policy and Management act of 1976, as amended (43 u.s.c. 1752), title iii of the

Bankhead-Jones Farm Tenant Act (7 U.S.C. 1010 et seq.), or, if applicable, Section 510 of the California Desert Protection Act (16 U.S.C. 410aaa-50). in accordance with public law 108-108 the terms and conditions contained in the expired or transferred permit or lease AND shall continue in effect under the renewed permit or lease until such time as the secretary of the interior completes processing of this permit or lease in compliance with all applicable laws and regulations, at which time this permit or lease may be canceled, suspended, or modified, in whole or in part, to meet the requirements of such applicable laws and regulations.

4.0 Rangeland Inventory and Monitoring Methodology

Documents and publications used in the assessment process utilized in rangeland inventory and monitoring are include the Ecosystems Dynamics Interpretive Tool (EDIT) available online at <https://edit.jornada.nmsu.edu/>, Web Soil Survey (USDA NRCS 2021), Interpreting Indicators of Rangeland Health (IIRH) Technical Reference 1734-6 (Pellant et al. 2020, and National Range and Allotment Handbook (USDA NRCS 2003). A complete list of reference is included at the end of this document. The ID Team used rangeland monitoring data and professional observation to assess conformance with the Arizona Standards for Rangeland Health.

4.1 Monitoring Protocol

Monitoring occurred within the Evaluation Area at 10 key areas. One of the key areas was monitored but will not be carried forward due to limited access of cattle to this location. The site was determined to not be representative of how livestock are utilizing the allotment and any information gathered from this location would not contribute to the Land Health Evaluation. Each of the individual allotments within the Evaluation Area had at least one key area monitored within the allotment, see Section 5.2.2 for more information on key areas. Quantitative measurements for soil cover and species composition were collected along each transect and were analyzed in conjunction with qualitative indicators of soil and site stability, hydrologic function, and biological health. This was completed to assess the existing conditions within the ecological sites associated with each key area. The existing conditions were compared to site-specific reference conditions established by the NRCS, which are considered to be representative of relatively undisturbed states within a given soil-plant community type. This comparison between existing and reference conditions determines the level of departure if any from the potential natural community.

The key area was recorded using a global positioning system (GPS) using a projection of World Geodetic System (WGS) 84.

4.1.1 Line Point Intercept

The method used to obtain quantitative transect data pertaining to species composition and soil cover is line point intercept (LPI). This method consists of a horizontal, linear measurement of plant intercepts along the course of a line (meter tape) 50 meters in length. The LPI method is rapid and accurate for measuring occurrence of grass or grass-like plants, forbs, shrubs, and trees

in which vegetation composition is extrapolated. It also quantifies soil cover, including vegetation, litter, rocks, biotic crusts and bare ground. These measurements are indicators of wind and water erosion, water infiltration, and the ability of the site to resist and recover from degradation. A summary of the LPI measurements is incorporated into the discussions for Standards 1 and 3 below.

4.1.2 Indicators of Rangeland Health

The five steps for the IIRH include protocols for evaluating the three rangeland health attributes (soil and site stability, hydrologic function, and biotic integrity), as outlined in Technical Reference 1734-6 (Pellant et al. 2020). They are:

Step 1. Identify the Key Area; Determine the Soil and Ecological Site

Step 2. Obtain or Develop the Reference Sheet and the Corresponding Evaluation Matrix

Step 3. Collect Supplementary Information

Step 4. Rate the 17 Indicators on the Evaluation Sheet

Step 5. Determine the Functional Status of the Three Rangeland Health Attributes:

1. Soil and Site Stability (S) – The capacity of an area to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water.
2. Hydrologic Function (H) – The capacity of an area to capture, store, and safely release water from rainfall, run-on and snowmelt (when relevant), to resist a reduction in this capacity, and to recover this capacity when a reduction does occur.
3. Biotic Integrity (B) – The capacity of the biotic community to support ecological processes within the normal range of variability expected for the site, to resist a loss in the capacity to support these processes, and to recover this capacity when losses do occur. The biotic community include plants, animals, and microorganisms occurring both above and below ground.

The IIRH provides information on the functioning of ecological processes (water cycle, energy flow, and nutrient cycle) relative to the reference state for the ecological site or other functionally similar unit for that land area. This assessment provides information that is not available with other methods of evaluation. It gives an indication of the status of the three rangeland attributes chosen to represent the health of the key area (i.e., the area where the evaluation of the rangeland health attributes occurs). The following are the 17 indicators that are evaluated during a IIRH assessment and the attribute(s) they measure:

1. Rills: S, H
2. Water Flow Patterns: S, H
3. Pedestals and/or Terracettes: S, H
4. Bare Ground: S, H

5. Gullies: S, H
6. Wind-Scoured, Blowout, and/or Depositional Areas: S
7. Litter Movement: S
8. Soil Surface Resistance to Erosion: S, H, B
9. Soil Surface Loss or Degradation: S, H, B
10. Plant Community Composition and Distribution Relative to Infiltration and Run off: H
11. Compaction Layer: S, H, B
12. Functional/Structural Groups: B
13. Plant Mortality/Decadence: B
14. Litter Cover: H, B
15. Annual Production: B
16. Invasive Plants: B
17. Reproductive Capability of Perennial Plants: B

Attribute ratings reflect the degree of departure from expected levels for each indicator per the reference sheet. The degree of departure may be categorized (rated) as:

- None to Slight
- Slight to Moderate
- Moderate
- Moderate to Extreme
- Extreme to Total

5.0 Objectives

This section provides an overview of the Safford Field Office management objectives that are associated with the Evaluation Area per the Phoenix Resource Management Plan (RMP) (USDI BLM 1989), as amended by the decision record for Arizona Standards and Guidelines. The Phoenix RMP incorporates by reference the decision from the Eastern Arizona Grazing Final Environmental Impact Statement (FEIS) Record of Decision (ROD;1987).

5.1 Land Use Plan Management Objectives

- Grazing Management (GM-02): The grazing program in the area is managed under the provisions of the Taylor Grazing Act of 1934, the Federal Land Policy and Management Act of 1976 (FLPMA), and the Public Rangelands Improvement Act of 1978. [Phoenix] RMP page 14-15.
- GM-03: Management of rangeland resources is guided by the Range Program Summary Record of Decision (RPS) which selected the Preferred Alternative analyzed in the 1987 Arizona Grazing FEIS. [Phoenix] RMP page 15.
- Wildlife/Fisheries (WF-03): Wildlife and plants which are federally listed or proposed for listing as either threatened or endangered are protected under provisions of the Endangered Species Act of 1973, as amended. [Phoenix] RMP page 15.

- WF-04: It is BLM policy to avoid jeopardizing the continued existence of any listed or proposed species and to actively promote species recovery. [Phoenix] RMP page 15.
- WF-05: It is BLM policy to manage federal candidate species and their habitat to prevent the need for listing as threatened or endangered. [Phoenix] RMP page 15.

Further, The Phoenix RMP provides the following grazing management objectives: 1) to restore and improve rangeland condition and productivity; 2) to provide for use and development of rangeland; 3) to maintain and improve habitat and viable wildlife populations; 4) to control future management actions; and 5) to promise sustained yield and multiple use.

5.2 Allotment Specific Objectives

The Allotments in the Evaluation Area are subject to the following objectives as established in the Arizona Standards for Rangeland Health:

5.2.1 Land Health Standards

Standard 1 – Upland Sites

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate and landform (ecological site).

Standard 2 - Riparian-Wetland Site

Objective: Riparian-wetland areas are in proper functioning condition.

Standard 3 - Desired Resource Conditions

Objective: Productive and diverse upland and riparian-wetland communities of native species exist and are maintained.

5.2.2 Key Area Objectives

In grazing administration, a key area is defined as a relatively small portion of a range selected because of its location, use, or grazing value as a monitoring point for grazing use. Key areas are indicator areas that can reflect what is happening on a larger area as a result of on-the-ground-management actions. A key area should be a representative sample of a large stratum, such as a pasture, grazing allotment, wildlife habitat area, herd management area, watershed area.

Objectives should be developed so that they are specific to the key area. Monitoring studies can then be designed to determine if these objectives are being met (USDI BLM and USDA USFS 1996).

The key areas within the Evaluation Area were chosen because they were determined to be representative of the vegetation composition, soils, vegetative production, and overall grazing management on the BLM-administered land within the grazing allotment. [*Table 7: Key Areas*](#) below shows the key areas, location, and associated ecological sites.

Table 7: Key Areas

Allotment	Key Area	Ecological Site	ESD ID	Coordinates
Flying Butte	FB-1	Clay Loam Terrace 6-10" p.z. Sodic	R035XB237AZ	35.134349 -110.302819
Flying Butte	FB-2	Mudstone/Sandstone Hills 6-10" p.z.	R035XB201AZ	35.151350 -110.318055
Flying Butte	FB-3	Shale Upland 6-10" p.z.	R035XB220AZ	35.143269 -110.211841
Manila Wash	MW-2	Shale Upland 6-10" p.z.	R035XB220AZ	34.985042 -110.359910
Marcou Mesa	MM-1	Clay Loam Terrace 6-10" p.z. Sodic	R035XB237AZ	35.070649 -110.363031
Marcou Mesa	MM-2	Sandy Upland 6-10" p.z. Sodic	R035XB223AZ	35.013943 -110.328588
Marcou Mesa East	MME-1	Shale Upland 6-10" p.z.	R035XB220AZ	35.034204 -110.206706
Mesa Wash	Mesa Wash-1	Sandy Upland 6-10" p.z. Sodic	R035XB223AZ	34.998622 -110.319368
Pipeline	PL-1	Mudstone/Sandstone Hills 6-10" p.z.	R035XB201AZ	34.927076 -110.219146

This LHE presents and evaluates the results from monitoring of the key area conducted by the Safford BLM interdisciplinary (ID) Team made up of two rangeland management specialists, a wildlife biologist, and a hydrologist. Refer to [Appendix D: LPI Monitoring Data for Key Areas Compared to DPC Objectives](#) for the monitoring data completed in 2021. The key area objectives for the allotments within the Evaluation Area are to meet the land health standards as established in the Arizona Standards for Rangeland Health. Specific objectives are defined below for each ecological site present at the key areas (monitoring locations) to guide the determination of whether land health standards are being met.

Standard 1 – Upland Sites (Applicable to all Monitoring locations)

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site).

Signs of accelerated erosion that are rated None to Slight or Slight to Moderate are appropriate for this ecological site as indicated by ground cover (litter, rock, vegetative [canopy] cover, etc.) and signs of erosion. This objective applies to the key area and the corresponding ecological site. A departure of Moderate or greater would not be achieving the standard. A departure of None to Slight or Slight to Moderate is considered achieving the standard.

Standard 2 – Riparian-Wetland Site (Applicable to all Monitoring Locations)

Objective: Riparian-wetland areas are in proper functioning condition.

Standard 2 is not applicable because no riparian-wetland habitats exist on BLM-administered lands within the Evaluation Area, see [Section 2.2.5 Watershed](#), for further discussion on Standard 2 for the Evaluation Area.

Standard 3 – Desired Resource Conditions

Objective: Productive and diverse upland and riparian-wetland communities of native species exist and are maintained.

The DPC objectives are criteria established to evaluate a site's capability of achieving desired resource conditions. The DPC objectives are typically specific to the ecological sites within the Evaluation Area; therefore, the DPC objectives were established using the ESD reference sheet for each ecological site in which monitoring occurred. The DPC objectives and methodology is provided in [Appendix C: DPC Objectives and Methodology for Associated Ecological Sites](#) as well as the website to access each ESD reference sheet(s). Desired resource conditions are based upon the following DPC objectives: plant community composition, bare ground, canopy and basal cover, and litter. The following table shows the key areas associated with each ecological site along with the specific DPC objectives applicable to that ecological site.

Table 8: DPC Objectives for Ecological Sites with the Evaluation Area

DPC Objectives for Ecological Sites within the Evaluation Area		
Ecological Site	Key Areas within the Ecological Site	DPC Objectives
Clay Loam Terrace 6-10" p.z. Sodic (R035XB237AZ)	FB-1 MM-1	<ul style="list-style-type: none"> • Maintain grasses at 55-67% composition • Maintain forbs at 0-11% composition • Maintain shrubs at 33-34 % composition • Maintain bare ground at 35-55% • Maintain canopy cover at 15-35% • Maintain basal cover at 5-12% • Maintain litter cover at 15-30%
Mudstone/Sandstone Hills 6-10" p.z. (R035XB201AZ)	FB-2 PL-1	<ul style="list-style-type: none"> • Maintain grasses at 50-64% composition • Maintain forbs at 0-9% composition • Maintain shrubs at 36-41 % composition • Maintain bare ground at 20-40% • Maintain canopy cover at 10-31% • Maintain basal cover at 4-10% • Maintain litter cover 0-40%
Shale Upland 6-10" p.z. (R035XB220AZ)	MME-1 MW-2 FB-3	<ul style="list-style-type: none"> • Maintain grasses at 65-72% composition • Maintain forbs at 9-12% composition • Maintain shrubs at 19-23 % composition • Maintain bare ground at 25-50% • Maintain canopy cover 5-12% • Basal Cover >2% • Maintain litter cover 0%
Sandy Upland 6-10" p.z. Sodic R035XB223AZ	Mesa Wash-1 MM-2	<ul style="list-style-type: none"> • Maintain grasses at 80-91% composition • Maintain forbs at 5-6% composition • Maintain shrubs at 3-15 % composition • Maintain bare ground at 50-75% • Maintain canopy cover at 17-39% • Maintain basal cover at 6-13% • Maintain litter Cover at 5-15%

6.0 Land Health Standards and Determination

The following information is the evaluation and summary of the monitoring data collected on the allotments within the Evaluation Area.

6.1 Flying Butte Allotment No. 06074

The following is the Land Health Standards and Determination for the Flying Butte Allotment.

6.1.1 Actual Use

The Flying Butte Allotment is authorized for 636 AUMs per year. Livestock grazing on the Flying Butte Allotment is permitted as a Section 15 Lease. Authorized AUMs are calculated on BLM-administered land only. Lease holders are billed for their maximum use available on public lands unless non-use is requested and approved. In 2013 the permittee utilized 154 AUMs and in 2014 the permittee utilized 462 AUMs. The remainder of the years covered under this evaluation the full 636 AUMs were utilized.

6.1.2 Land Health Evaluation

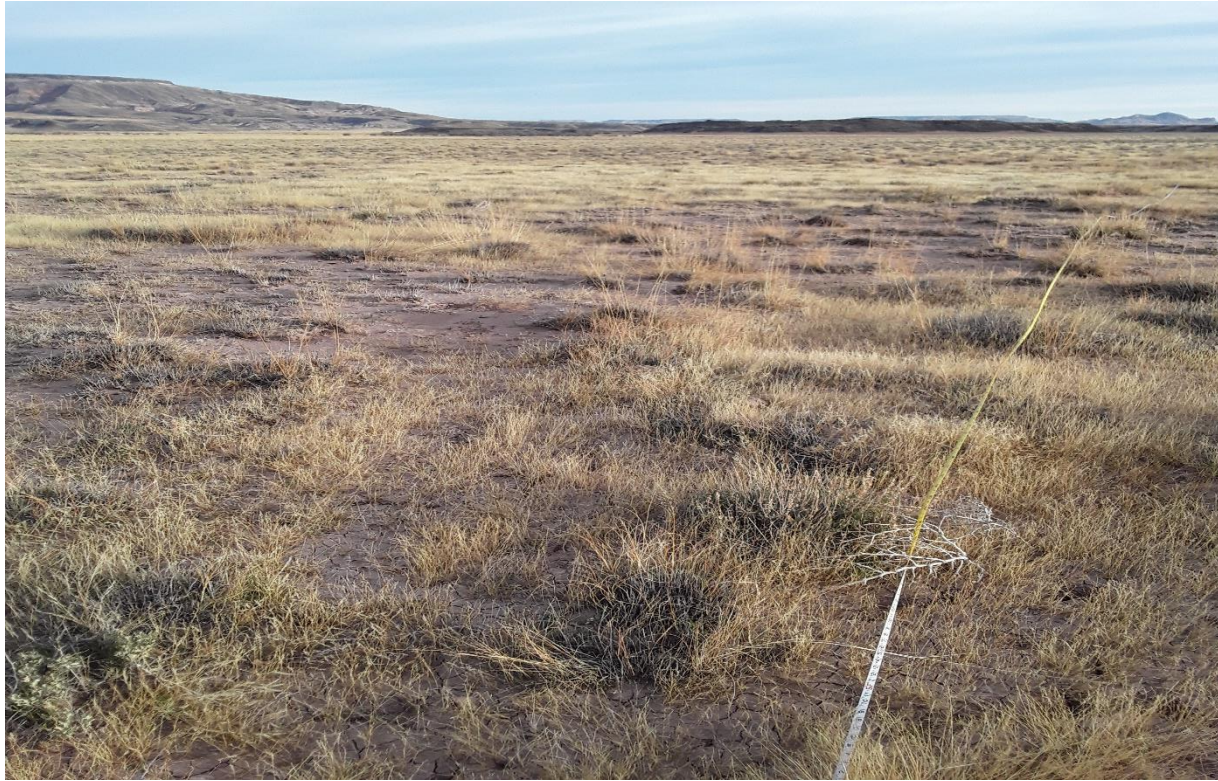
The IIRH assessment of the three rangeland health attributes was completed at key areas FB-1, FB-2, and FB-3 on the Flying Butte Allotment. Ratings of Moderate or more are considered to indicate resource concerns for soil erosion, water quantity, and plant productivity. The Ratings given by the ID team are made relative to the potential for the site. For example, a site with highly erodible soils and low potential for stabilizing vegetation may be rated as having a Slight departure from reference conditions even though the actual amount of soil movement is significant, while a site with a high potential for stability rated Moderate may have relatively little soil movement. A summary of the IIRH assessment conducted at each key area is presented in *Table 9: Flying Butte IIRH Summary* below.

Table 9: Flying Butte IIRH Summary

Key Area	Ecological Site	Range Health Attributes – Degree of Departure		
		Soil and Site Stability	Hydrologic Function	Biotic Integrity
FB-1	Clay Loam Terrace 6-10" p.z. Sodic	None to Slight	None to Slight	None to Slight
FB-2	Mudstone/Sandstone Hills 6-10" p.z.	None to Slight	None to Slight	None to Slight
FB-3	Shale Upland 6-10" p.z.	None to Slight	None to Slight	Slight to Moderate

6.1.3 Key Area FB-1, Clay Loam Terrace 6-10" p.z. Sodic, IIRH Assessment

Photo 1: Key Area FB-1 North Aspect



A summary of the ESD reference sheet and comments/observations from IIRH monitoring can be found in Appendix F. 1: Key Area FB-1

Table 10: Key Area FB-1, Clay Loam Terrace 6-10" p.z. Sodic, IIRH Assessment

Clay Loam Terrace 6-10" p.z. Sodic R035XB237AZ Key Area FB-1 ESD Reference Sheet Indicators and Attribute Ratings			
Reference Sheet Indicators	Reference Sheet Description	Site Observations/Comments	Attribute Rating
1. Number and extent of rills: (S, H)	Rills may occur occasionally due to clay loam and clay textures, slow permeability, moderate to high shrink/swell (cracking) characteristics of may soils, and rare flooding. The number and length of rills will be limited by the generally low slopes on the site. Rills should be uncommon due to moderate plant cover potential of the site.	Some Rills observed. A dam present near the site that could be impacting/reducing waterflow. Site had very little slope present and rills were estimated to be 3-4 ft in length, which is within the ESD description.	N-S

2. Presence of water flow patterns: (H)	Water flow patterns may be due to the slow permeability of the soil, high shrink/swell characteristics of the soils and rare flooding. Patterns should be short (less than 8') and discontinuous due to moderate plant cover potential of the site.	Waterflow patterns were disconnected but present. Observed waterflow was less than 8'. Dam presence near site could be affecting water flow.	N-S
3. Number and height of erosional pedestals or terracettes: (S, H)	None	None observed.	N-S
4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): (S, H)	Bare ground ranges from 35-55% and has the potential to produce a heavy amount of plant cover and litter due to an average water capacity of 10.7 inches. Drought may cause increase in bare ground.	Bare ground was recorded at 20%, an increase in annual grasses was observed reducing bare ground.	N-S
5. Number of gullies and erosion associated with gullies (S, H)	None	None observed.	N-S
6. Extent of wind scoured, blowouts and/or depositional areas: (S)	None	None observed.	N-S
7. Amount of litter movement (describe size and distance expected to travel): (S)	Herbaceous and woody litter will be transported throughout the site by water during rare flood events. Herbaceous litter will also be redistributed by wind.	Litter movement was observed in waterflow patterns and matched the reference sheet.	N-S
8. Soil surface (top few mm) resistance to erosion (stability values are averages – most sites will show a range of values): (S, H, B)	Soils have moderate shrink/swell properties and cracking may be common on the surface. If cracks do occur on the surface, this process will reduce aggregate stability. When well vegetated and not subjected to severe flood events, these soils have a low to moderate resistance to water erosion and moderate resistance to wind erosion. Average Soil Site Stability are 1.5 (range 1-4), averages with canopy are 3 to 4, averages with no canopy are 1 to 2.	Soil stability tests were conducted in the interspaces and under plant canopy. Interspace Avg: 2 Plant canopy Avg: 3 The site was well vegetated and showed resistance to water erosion, allowing for acceptable soil stability on the site.	N-S
9. Soil surface structure and SOM content (include type of structure and A-	Soil surface structure is mostly moderate thick platy structure parting to strong very fine granular. The A-horizon thickness is 2-6	Soil pit was dug at the site location and matched the description as provided. The A -horizon did not differ significantly from the subsurface soil horizons.	N-S

horizon color and thickness): (S, H, B)	inches. The A-horizon did not differ significantly from the subsurface soil horizons.		
10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: (H)	This site is characterized by a relatively even distribution of grasses with scattered shrubs. There may be small patches or a light overstory of large shrubs. Vegetative canopy cover ranges from 15-35% (grasses>shrub>forbs). Basal cover ranges 5-12% (predominately grasses) for vascular plants and 0-1% for biological crust (moss>lichen>cyanobacteria). Both canopy and basal cover values decrease during a prolonged drought. This type of plant community is moderately effective at capturing and storing precipitation.	Observed relatively even distribution of grass and scattered shrubs. Alkali Sacaton (<i>Sporobolus airoides</i>) was the dominant perennial grass at 18% composition and Shadscale saltbush (<i>Atriplex confertifolia</i>) had a 13% composition. The site showed an increase in annual grasses. Attributed to the wet monsoon season in 2021. The plant community on site is capable of moderately capturing and storing precipitation.	N-S
11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): (S, H, B)	None. Naturally, there would not be a compaction layer, but these soils are easily compacted when wet and disturbed. Most of the soils may be easily compacted when wet due to clay loam and clay textures, lack of rock fragments, and occasional moisture from flooding. Most soils have a naturally granular surface structure.	None observed.	N-S
12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: (B)	Dominant: Sub-dominant: perennial bunch grasses>perennial sod-forming grasses>shrubs>> Other: annual grasses = annual forbs > perennial forbs.	Alkali Sacaton (<i>Sporobolus airoides</i>) perennial grass > Shadscale saltbush (<i>Atriplex confertifolia</i>) shrub. Increase in annual grasses at the site, attributed to wet 2021 monsoon season. Annual grasses had greater composition then other vegetation on the site and a S-M rating was given due to this.	S-M
13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): (B)	All plant functional groups are adapted to survival in all but the most severe droughts. Severe winter droughts affect the shrubs the most. Severe summer droughts affect grasses the most.	More decadence than expected was observed throughout the site. Vegetation still present and capable of reproducing.	S-M

14. Average percent litter cover (%) and depth (in): (B)	Litter amounts increase during the first few years of drought then decrease in later years.	Litter was measured at 26% and was within the 15-30% range as provided in the ESD reference sheet.	N-S
15. Expected annual-production (this is TOTAL above-ground annual production, not just forage annual-production): (B)	Average annual production on this site is expected to be 400 to 500 lbs/ac. In a year of average annual precipitation.	Annual production was assessed with ocular estimation and to be within the 400-500 lbs./ac range.	N-S
16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site: (B)	Broom snakeweed, mound saltbush, and greasewood are native to the site but may have the potential to increase and dominate after heavy grazing. Saltcedar, Russian knapweed, and camelthorn are non-natives that have the potential to invade the site with or without disturbance. Cheat grass is a non-native annual grass that has the potential to invade and dominate with or without disturbance. Annual wheatgrass and Russian thistle are introduced annuals that have the potential to invade after heavy continuous grazing or disturbance, especially if the site is near farm fields or disturbed lands.	Saltcedar (<i>Tamarisk spp.</i>) and cocklebur (<i>Xanthium strumarium</i>) were present but not dominating. Influence from the nearby dam is possibly attributing more water for these plants to be occurring and are often associated with such infrastructure.	N-S
17. Perennial plant reproductive capability: (B)	All plants native to the site are adapted to the climate and are capable of producing seeds, stolons, and/or rhizomes during the most severe droughts.	Vegetation observed was capable of reproducing. Various age classes observed.	N-S

All ten indicators for soil and site stability were rated None to Slight; therefore, the overall rating for the Soil and Site Stability attribute was rated None to Slight. All ten indicators for hydrologic function were rated None to Slight; therefore, the overall rating for the Hydrologic Function attribute was rated None to Slight. Indicators 12 and 13 were rated Slight to Moderate, the other

seven indicators associated with Biotic Integrity were rated None to Slight, therefore the overall rating for Biotic Integrity was None to Slight.

6.1.4 Key Area FB-1, Clay Loam Terrace 6-10" p.z. Land Health Determination

Standard 1: Upland Sites

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate.

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

Overall soils throughout key area FB-1 are productive, stable, and in a sustainable condition. The key area monitoring data reflects the conditions described in the ESD reference sheet and are acceptable for meeting the upland sites standard. The data from the LPI monitoring showed that annual grass accounted for 67 percent composition, perennial grasses accounted for 18 percent composition and shrubs accounted for 13 percent composition. Annual grasses accounted for the majority of the composition, and this was attributed to the wet monsoon season in 2021 allowing annual grasses to establish in the later months of the year. It was determined that vegetation is adequate in ensuring soil stabilization and appropriate permeability rates within the ecological site. Litter cover was within the ESD reference sheet and bare ground was measured at 20 percent well below the 35-55 percent range as provided in the ESD reference sheet, indicating the site was well vegetated. All ten indicators for the Soil and Stability attribute were rated None to Slight indicating that upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, and climate.

Standard 2: Riparian-Wetland Sites

Objective: Riparian-wetland areas are in proper functioning condition.

Determination:

- ☐ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard
- ☒ Standard Does Not Apply

Rationale:

There are no riparian-wetland sites on BLM-managed land within the Flying Butte Allotment; therefore, Standard 2 does not apply.

Standard 3: Desired Resource Conditions

Objective: Productive upland and riparian-wetland communities of native species exist and are maintained

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

Based on the monitoring data and evaluation of key area FB-1 it was determined that desired resource conditions are being attained and Standard 3 is being met at this key area. The IIRH assessment demonstrates that soil and site stability, hydrologic function, and biotic integrity have a None to Slight departure and the site is functioning, producing and maintaining within its expected capabilities. The comparison of LPI monitoring results to the DPC objectives displayed in the table below, show the site is meeting or exceeding all DPC objectives, therefore Standard 3 is being met.

Table 11: Key Area FB-1 Summary

FB-1: Clay Loam Terrace 6-10" p.z. Sodic (R035XB237AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	55-67%	84%
Composition of Forbs	0-11%	3%
Composition of Shrubs	33-44%	13%
Bare Ground	35-55%	20%
Canopy Cover	15-35%	70%
Basal Cover	5-12%	12%
Litter Cover	15-30%	26%

6.1.5 Key Area, Mudstone/Sandstone Hills 6-10” p.z., FB-2 IIRH Assessment

Photo 2: Key Area FB-2 North Aspect



6.1.6 Key Area FB-2, Mudstone/Sandstone Hills 6-10’ p.z., Land Health Determination

A summary of the ESD reference sheet and comments/observations from IIRH monitoring are provided in the table below followed by a short summary of the indicators.

Table 12: Key Area FB-2 IIRH Assessment

Mudstone/Sandstone Hills 6-10” p.z R035XB201AZ Key Area FB-2			
Reference Sheet Indicators	Reference Sheet Description	Site Observations/Comments	Attribute Rating
1. Number and extent of rills: (S, H)	A few rills occur throughout site (1-10% cover) at infrequent intervals, mostly in exposed areas. Rills may be 8 or more feet in length and are likely to form below or adjacent exposed bedrock or areas where surface rock fragments are less than 15%. The number of rill	No rills observed. The site has a high amount armoring due to rock fragment cover, eliminating rills.	N-S

	and extent will increase on slopes greater than 35%, or sites with a decrease of herbaceous cover and/or immediately following high intensity storm events.		
2. Presence of water flow patterns: (S, H)	The occurrence of water flow patterns is frequent (5-10% cover) and occur throughout the site interspersed throughout the larger rock fragments. These waterflow patterns are typically less than 6 feet long. As slope increase (>15%) water flow pattern occurrence and length increases. A temporary increase in water flow patterns is also expected following high intensity storm events.	Waterflow patterns observed throughout the site, influenced by rock fragment but within the ESD description. Less than 6 feet with some areas on steeper slopes greater than 6 feet.	N-S
3. Number and height of erosional pedestals or terracettes: (S, H)	Some slight pedestalling (1-2" inch) can occur at the base of plants and rocks as a result of natural wind and water erosion in the reference state; however, terracettes are uncommon and occur only in flow paths. On steeper slopes (>35%), pedestalling and terracettes can be at moderate amounts with no exposed roots.	Some pedestalling observed within waterflow patterns. No terracettes were observed.	N-S
4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): (S, H)	20 to 40% bare ground depending on rock and gravel cover. Bare areas are moderate in size but are rarely connected.	Bare ground measured at 32% within the 20-40% range as provided in the ESD.	N-S
5. Number of gullies and erosion associated with gullies (S, H)	Gullies can occur in deeper soil with less rock cover with occasional headcuts on steeper slopes. There are numerous large drainages on this site that are stable; lined with bedrock and intermittent vegetation.	Site was well vegetated and armored with rock fragments. Drainages are expected or the site and were observed. No gullies observed.	N-S
6. Extent of wind scoured, blowouts and/or depositional areas: (S)	None.	None observed.	N-S
7. Amount of litter movement (describe size and distance expected to travel): (S)	Most herbaceous and fine woody litter will be transported and concentration by wind and	As described in reference sheet litter movement observed mainly in flow patterns, with some	N-S

	water in flow pathways and around obstructions, while a very small percentage stays in place. Coarse woody litter (>1/4" diameter) and duff will accumulate under shrub canopies.	accumulation under shrub cover.	
8. Soil surface (top few mm) resistance to erosion (stability values are averages – most sites will show a range of values): (S, H, B)	This site should have an average soil stability rating of 4 throughout the site. Surface texture varies from sandy loam to gravelly/cobbly loam.	<p>Soil stability tests were conducted in the interspaces and under plant canopy. Interspace Avg. 1.33 Plant canopy Avg. 2.83</p> <p>A S-M rating was given with more emphasis towards M, observations on the site did not indicate signs of erosion and it was determined that although the soil stability test was lower than expected the soils were showing resistance to erosion.</p> <p>ESD Average should be 4, site average was 2.08.</p>	S-M
9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): (S, H, B)	Soil surface varies from 2 to 4 inches. Structure is generally weak thin platy. Color is reddish brown (2.5YR 5/4). The A horizon will show minimal difference in structure and depth between interspaces and under plant canopies.	Soil pit was dug at the site location and matched the description as provided.	N-S
10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: (H)	This site is characterized by a relatively even distribution of mostly perennial grasses and low shrubs across the landscape. Canopy and basal cover are dominated by warm season grasses and evergreen shrubs. Both plant cover values (especially basal) decrease during prolonged summer drought. This type of plant community along with surface rock cover and slopes are somewhat effective at capturing and storing precipitation.	<p>Site compositions was; Grasses>Shrub>Forb, which LPI data confirms. Infiltration occurring and runoff precipitation not departing site due to community composition.</p> <p>Perennial Grasses included Alkali Sacaton (<i>Sporobolus airoides</i>) 40%, Blue grama (<i>Bouteloua gracilis</i>) 10% > Shrubs which included Shadscale saltbush (<i>Atriplex confertifolia</i>) and Broom snakeweed (<i>Gutierrezia sarothrae</i>)</p>	N-S

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): (S, H, B)	None. These soils are not easily compacted due to cover of rock fragments and the volume of rock fragments in the subsurface horizons of the profile.	None observed.	N-S
12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols (B))	Dominant: Evergreen shrubs (25-35%) > Warm season colonizing grasses (15-20%) = Cool season bunch grasses (15-20%) Sub-dominant: Deciduous shrubs (5-15%) > Warm season bunch grasses (5-10%) forbs (5-10%) Other: Cacti (0-3%)	Functional structural group of Grasses>Shrub>Forb. LPI data confirms. Perennial Grasses included Alkali Sacaton (<i>Sporobolus airoides</i>) 40%, Blue grama (<i>Bouteloua gracilis</i>) 10% > Shrubs which included Shadscale saltbush (<i>Atriplex confertifolia</i>) and Broom snakeweed (<i>Gutierrezia sarothrae</i>).	N-S
13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): (B)	In a normal year up to 10 to 15% of grasses and shrubs die off. During and after drought years there can be from 10 to 25% die off of shrubs and grasses. Severe winter droughts affect shrubs, and cool season grasses the most. Severe summer droughts affect the warm season grasses the most.	Decadence observed at 10 to 20% per ocular estimation. This decadence was deemed appropriate for the sites climatic influences.	N-S
14. Average percent litter cover (%) and depth (in): (B)	Within plant interspaces litter ranges from 0 to 10% cover with no real depth, while under shrub canopies it ranges from 20 to 40% cover with depths from 1/8 to 1/2 inches thick. Litter amounts increase during the first few years of drought, then decrease in later years.	Litter measured at 24% within ESD reference sheet.	N-S
15. Expected annual-production (this is TOTAL above-ground annual production, not just forage annual-production): (B)	Average annual production on this site is expected to be 300 to 400lbs/ac. In a year of average annual precipitation.	Ocular production estimation observed at 300 to 400 lbs./ac.	N-S
16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded	Non-native species that can invade and establish on this site are cheat grass and Russian thistle. Native species such as James'	Observed higher presence of invasive snakeweed, leading to a slight departure from reference. However, Winterfat was	S-M

states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site. (B)	galleta, broom snakeweed, rabbitbrush and Mormon tea are native to the site, but can increase with disturbance.	also observed and is an indicator species of a site capable of maintaining a productive native vegetation community.	
17. Perennial plant reproductive capability: (B)	All plants native to this site are adapted to the climate and are capable of producing seeds, stolons and rhizomes except during the most severe droughts.	Vegetation observed was capable of reproducing. Various age classes observed.	N-S

Indicator 8 was rated as Slight to Moderate the other nine indicators associated with Soil and Site Stability were rated None to Slight; therefore, the overall rating for the Soil and Site Stability attribute was rated None to Slight. Indicator 8 was rated as Slight to Moderate the other nine indicators associated with hydrologic function were rated None to Slight; therefore, the overall rating for the Hydrologic Function attribute was rated None to Slight. Indicators 8 and 16 were rated Slight to Moderate, the other seven indicators for associated with Biotic integrity were rated None to Slight, therefore the overall rating for Biotic integrity was None to Slight

Standard 1: Upland Sites

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate.

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

Overall soils throughout key area FB-2 are productive, stable and in a sustainable condition. The key area monitoring data reflects the conditions described in the ESD reference sheet and are acceptable for meeting the upland sites standard. The data from the LPI monitoring showed that perennial grasses accounted for 50 percent composition and shrubs accounted for 30 percent

composition and annual forbs accounted for 20 percent composition. It was determined that vegetation is adequate in ensuring soil stabilization and appropriate permeability rates within the ecological site. Litter cover was within the ESD reference sheet and bare ground was measured at 32 percent within the 20-40 percent range as provided in the ESD reference sheet indicating that the site is well vegetated and functioning within its capabilities. Soil surface resistance to erosion Indicator 8 showed a Slight to Moderate departure rating, this was measured using the soil stability test which resulted in values slightly less than expected as indicated in the ESD reference sheet. The other nine indicators associated with Soil and Stability attribute were rated None to Slight, indicating that upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, and climate.

Standard 2: Riparian-Wetland Sites

Objective: Riparian-wetland areas are in proper functioning condition.

Determination:

- ☐ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard
- ☒ Standard Does Not Apply

Rationale:

There are no riparian-wetland sites on BLM-managed land within the Flying Butte Allotment; therefore, Standard 2 does not apply.

Standard 3: Desired Resource Conditions

Objective: Productive upland and riparian-wetland communities of native species exist and are maintained

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

Based on the monitoring data and evaluation of key area FB-2 it was determined that desired resource conditions are being achieved and Standard 3 is being met at this key area. The IIRH assessment demonstrates that soil and site stability, hydrologic function, and biotic integrity have a None to Slight departure rating and the site is functioning within its capabilities. The table below demonstrates the monitoring data compared to the DPC objectives as established by the ESD reference sheet and ID team input. Overall LPI results show all DPC objectives meeting or exceeding the desired conditions, this indicate a productive upland community of native vegetations based on the cover amounts and species composition present at FB-2, these results are achieved by these cover amounts and species composition being maintained over the years.

Table 13: Key Area FB-2 Summary

FB-2: Mudstone/Sandstone Hills 6-10" p.z. (R035XB201AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	50-64%	50%
Composition of Forbs	0-9%	20%
Composition of Shrubs	36-41%	30%
Bare Ground	20-40%	20%
Canopy Cover	10-31%	20%
Basal Cover	4-10%	2%
Litter Cover	0-40%	32%

6.1.7 Key Area FB-3, Shale Upland 6-10" p.z., IIRH Assessment

Photo 3: Key Area FB-3 North Aspect



A summary of the ESD reference sheet and comments/observations from IIRH monitoring are provided in the table below followed by a short summary of the indicators.

Table 14: Key Area FB-3 IIRH Assessment

Shale Upland 6-10" p.z. R035XB220AZ Key Area FB-3			
Reference Sheet Indicators	Reference Sheet Description	Site Observations/Comments	Attribute Rating
1. Number and extent of rills: (S, H)	Somewhat common, especially on steepest slopes. Rills less than 10 feet long due to fine textured soils and scattered perennial plant cover. Sites armored with coarse fragments (gravel and channers) will have shorter rills and less frequent.	Few rills observed, plant cover was higher than expected resulting in fewer rills.	N-S
2. Presence of water flow patterns: (S, H)	Somewhat common throughout site. Water flow patterns may be long with low sinuosity and connected on steeper slopes. Sites armored with coarse fragments will have less evidence of flow patterns, but still common. Water flow patterns will show signs of deposition.	Waterflow patterns observed, less rock fragment cover on site increasing water flow presences.	N-S
3. Number and height of erosional pedestals or terracettes: (S, H)	Some long-lived plants may show some slight pedestals of less than ½" on slopes. Terracettes are few.	Few pedestals and terracettes observed.	N-S
4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): (S, H)	Expected bare ground ranges from 25-50% depending on surface fragments. Well developed, intact biological crust should not be counted as bare ground.	Bare ground measured at 34%.	N-S
5. Number of gullies and erosion associated with gullies (S, H)	None to very few. When site is well vegetated and covered with rock fragments gullies are stable and will only show minor signs of active erosion.	Very few gullies observed. Site was well vegetated.	N-S
6. Extent of wind scoured, blowouts and/or depositional areas: (S)	Deposition and blowouts by wind are not expected.	Wind scoured areas observed, less rock fragments than expected.	S-M
7. Amount of litter movement (describe size and distance expected to travel): (S)	Litter movement or redistribution by water is common and expected in water flow patterns. Some litter removal in water flow patterns is expected.	Litter movement observed in water flow patterns. Litter was measured at 24%.	N-S
8. Soil surface (top few mm) resistance to erosion	The expected average soil stability is 3 or 4. Surface	Soil stability tests were conducted in the	N-S

(stability values are averages – most sites will show a range of values): (S, H, B)	fragments, litter, and vegetation cover aid in reducing erosion.	interspaces and under plant canopy. Interspace Avg. 3.67 Plant canopy Avg. 5.67 ESD avg. 3-4.	
9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): (S, H, B)	Soil surface horizon is 2 to 4 inches deep. Structure is mostly weak thin platy parting to moderate very fine granular structure.	No distinguishable horizons, veg cover present and erosion was not observed at high rates.	N-S
10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: (H)	This site is characterized by a relatively even distribution of perennial grasses with scattered half-shrubs and is well distributed across the site and lends to slowing runoff and allowing for moderate infiltration.	Vegetation cover provided from grasses and shrubs, runoff limited, and site capable of infiltration. Shrubs observed on site but were not hit on LPI data.	N-S
11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): (S, H, B)	None.	None.	N-S
12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbol:s (B)	Dominant: Warm season perennial grasses (Alkali sacaton & galleta) > Shrubs (Mound saltbush & Shadscale saltbush) Sub-dominant: Cool season perennial grasses > other half-shrubs > forbs	Alkali Sacaton (<i>Sporobolus airoides</i>) warm season perennial grass > Shadscale Saltbush (<i>Atriplex confertifolia</i>) shrub > Annual Forbs. Shrubs had 0 percent composition on the LPI data but were observed throughout the site.	N-S
13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): (B)	All plant functional groups are adapted to survival in all but the most severe droughts. Severe winter droughts affect the shrubs the most. Severe summer droughts affect grasses the most.	Vegetation observed is capable of reproducing, observed decadence was not widespread.	N-S
14. Average percent litter cover (%) and depth (in): (B)	Herbaceous litter is not persistent on the site.	Litter measured at 24%.	N-S
15. Expected annual-production (this is TOTAL above-ground annual production, not just forage annual-production): (B)	The expected annual total production is 125 – 175 lbs./ac.	Annual production ocular estimation appeared greater than 175 lbs./ac. Increase in annual production was not negatively impacting the sight but due to it	S-M

		exceeding the range a S-M rating was determined to be appropriate.	
16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site. (B)	Mound saltbush, annual buckwheats, scorpionweed, and whitestem blazingstar are native to the site but may have the potential to increase with continued disturbance. Cheatgrass, annual wheatgrass, and Russian thistle are non-native annuals that have the potential to invade the site with or without disturbance.	Russian thistle (<i>Salsola kali</i> L.), camelthorn (<i>Alhagi maurorum</i>), and Halogeton (<i>Halogeton glomeratus</i>) present but not dominating the site. Due to three invasive species being present at the site, the departure rating was moderate. Disturbance may not be a factor with Russian thistle, and it does have the potential to spread.	M
17. Perennial plant reproductive capability: (B)	All plants native to the site are adapted to the climate and are capable of producing seeds, stolons, and /or rhizomes during the most severe droughts.	Vegetation observed was capable of reproducing. Various age classes observed.	N-S

Indicator 6 was rated as Slight to Moderate the other nine indicators associated with Soil and Site Stability were rated None to Slight; therefore, the overall rating for the Soil and Site Stability attribute was rated None to Slight. All ten indicators for hydrologic function were rated None to Slight; therefore, the overall rating for the Hydrologic Function attribute was rated None to Slight. Indicator 15 was rated Slight to Moderate, and Indicator 16 was rated Moderate, the other seven indicators associated with biotic integrity were rated None to Slight. The overall rating for the Biotic Integrity attribute was rated Slight to Moderate.

6.1.8 Key Area FB-3, Shale Upland 6-10" p.z., Land Health Determination

Standard 1: Upland Sites

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate.

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

Overall, the soils throughout key area FB-3, are functioning and in a sustainable condition. The key area monitoring data was determined to be acceptable for meeting the upland sites standard. The data from the LPI monitoring showed that perennial grasses accounted for 68 percent composition with annual grasses accounting for 7 percent composition. Annual forbs accounted for 25 percent composition; shrubs showed a 0 percent composition on the LPI data but were observed in the area. It was determined that vegetation is adequate in ensuring soil stabilization and appropriate permeability rates within the ecological site. Extent of wind scoured, blowouts and/or depositional areas Indicator 6 was rated Slight to Moderate as some areas were observed with wind scouring. The other nine indicators associated with Soil and Site Stability were rated None to Slight, indicating that upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type and climate.

Standard 2: Riparian-Wetland Sites

Objective: Riparian-wetland areas are in proper functioning condition.

Determination:

- ☐ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard
- ☒ Standard Does Not Apply

Rationale:

There are no riparian-wetland sites on BLM-managed land within the Flying Butte Allotment; therefore, Standard 2 does not apply.

Standard 3: Desired Resource Conditions

Objective: Productive upland and riparian-wetland communities of native species exist and are maintained

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

Based on the monitoring data and evaluation of key area FB-3 it was determined that desired resource conditions are being maintained and Standard 3 is being met at this key area. The IIRH

assessment demonstrates that soil and site stability, and hydrologic function have a None to Slight departure rating. Biotic integrity for this key area was rated as having an overall departure of Slight to Moderate. The site had three potential invasives present which were camelthorn, Russian thistle, and Halogeton. None of these species were dominating or overtaking the site and it was determined that capabilities of the ecological sight are still within the parameters as outlined in the ESD reference sheet. Russian thistle and camelthorn are both very common species to the general area and their presence is not site specific. The LPI data also showed some variation in the composition of plant species. Grasses remained dominate at the site and fell within the 65-72% range as described in the ESD. Forbs accounted for 25 percent of the composition and was much higher than expected. No shrubs were recorded on the LPI transect but it was noted that they were observed within the area and are in fact present within the ecological site but may be slightly lower than expected. It was determined that overall, the key area FB-3 was functioning within its capabilities and Standard 3 is being achieved. The table below provides the DPC objectives and results of the monitoring data.

Table 15: Key Area FB-3 Summary

FB-3: Shale Upland 6-10" p.z. (R035XB220AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	65-72%	75%
Composition of Forbs	9-12%	25%
Composition of Shrubs	19-23%	0%
Bare Ground	25-50%	34%
Canopy Cover	5-12%	52%
Basal Cover	>2%	6%
Litter Cover	0%	24%

6.1.9 Flying Butte Allotment Land Health Determination

Monitoring occurred on three key areas within the Flying Butte Allotment, land health determinations were provided for these three key areas and the overall determination for the Flying Butte Allotment is provided below based on the individual assessments of each of the key areas within the allotment.

Standard 1: Upland Sites

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate.

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard

☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale: Key Areas FB-1, FB-2 and FB-3 were determined to be meeting Standard 1 and therefore the Flying Butte Allotment is meeting the standard.

Standard 2: Riparian-Wetland Sites

Objective: Riparian-wetland areas are in proper functioning condition.

Determination:

- ☐ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard
- ☒ Standard Does Not Apply

Standard 3: Desired Resource Conditions

Objective: Productive upland and riparian-wetland communities of native species exist and are maintained

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale: Key Areas FB-1, FB-2 and FB-3 were determined to be meeting Standard 3 and therefore the Flying Butte Allotment is meeting the standard.

6.2 Manila Wash Allotment No. 06017

The following is the Land Health Standards and Determination as to whether they are being met on the Manila Wash Allotment.

6.2.1 Actual Use

Full permitted AUMs have been implemented on the Manila Wash Allotment during the evaluation period totaling 60 AUMs per year. Livestock grazing on the Manila Wash Allotment is permitted as a Section 15 Lease. Allowable AUMs are calculated on BLM-administered land only. Lease holders are billed for their maximum use available on public lands unless non-use is requested and approved.

6.2.2 Land Health Evaluation

The IIRH assessment of the three rangeland health attributes was completed at key area MW-2, originally the ID team had identified key area MW-1 as a monitoring location, however this site was later rejected due to its location which was unlikely to be utilized by cattle, making the site unreflective of livestock management on the allotment. MW-2 is the only key area identified for

the Manila Wash Allotment. Ratings of Moderate or more are considered to indicate resource concerns for soil erosion, water quantity, and plant productivity. The Ratings given by the ID team are made relative to the potential for the site. For example, a site with highly erodible soils and low potential for stabilizing vegetation may be rated as having a Slight departure from reference conditions even though the actual amount of soil movement is significant, while a site with a high potential for stability rated Moderate may have relatively little soil movement. A summary of the IIRH assessment conducted at each key area is presented in *Table 16: Manila Wash IIRH Summary* below.

Table 16: Manila Wash IIRH Summary

Key Area	Ecological Site	Range Health Attributes – Degree of Departure		
		Soil and Site Stability	Hydrologic Function	Biotic Integrity
MW-2	Shale Upland 6-10” p.z.	None to Slight	None to Slight	None to Slight

6.2.3 Key Area MW-2, Shale Upland 6-10” p.z., IIRH Assessment

Photo 4: Key Area MW-2 North Aspect



A summary of the ESD reference sheet and comments/observations from IIRH monitoring are provided in the table below followed by a short summary of the indicators.

Table 17: Key Area MW-2, Shale Upland 6-10" p.z., IIRH Assessment

Shale Upland 6-10" p.z. R035XB220AZ Key Area MW-2			
Reference Sheet Indicators	Reference Sheet Description	Site Observations/Comments	Attribute Rating
1. Number and extent of rills: (S, H)	Somewhat common, especially on steepest slopes. Rills less than 10 feet long due to fine textured soils and scattered perennial plant cover. Sites armored with coarse fragments (gravel and channers) will have shorter rills and less frequent.	Rills were observed throughout the sight, less than 10 feet long. Steeper slopes were present on the site.	N-S
2. Presence of water flow patterns: (S, H)	Somewhat common throughout site. Water flow patterns may be long with low sinuosity and connected on steeper slopes. Sites armored with coarse fragments will have less evidence of flow patterns, but still common. Water flow patterns will show signs of deposition.	Water flow patterns were observed throughout the sight and were long and connected. The site was conducive to water flow patterns due to the steeper slopes present. Rock fragment not present at site increasing presence of water flow patterns.	N-S
3. Number and height of erosional pedestals or terracettes: (S, H)	Some long-lived plants may show some slight pedestals of less than ½" on slopes. Terracettes are few.	Some terracettes were observed no pedestals observed.	N-S
4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): (S, H)	Expected bare ground ranges from 25-50% depending on surface fragments. Well developed, intact biological crust should not be counted as bare ground.	Bare ground was measured at 62%, slightly above the 25-50% range as described by the ESD reference sheet.	S-M
5. Number of gullies and erosion associated with gullies: (S, H)	None to very few. When site is will vegetated and covered with rock fragments gullies are stable and will only show minor signs of active erosion.	Gullies were observed, steeper slopes present on site potentially contributing to increase in the presence of gullies.	S-M
6. Extent of wind scoured, blowouts and/or depositional areas: (S)	Deposition and blowouts by wind are not expected.	None observed.	N-S
7. Amount of litter movement (describe size and distance expected to travel): (S)	Litter movement or redistribution by water is common and expected in water flow patterns. Some litter removal in water flow patterns is expected.	Litter movement present in water flow patterns.	N-S
8. Soil surface (top few mm) resistance to erosion	The expected average soil stability is 3 or 4. Surface	Soil stability tests were conducted in the	N-S

(stability values are averages – most sites will show a range of values): (S, H, B)	fragments, litter, and vegetation cover aid in reducing erosion.	interspaces and under plant canopy. Interspace Avg. 1.25 Canopy Avg. 3.83	
9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): (S, H, B)	Soil surface horizon is 2 to 4 inches deep. Structure is mostly weak thin platy parting to moderate very fine granular structure.	Soil pit confirmed soil structure to be intact, no loss or degradation observed.	N-S
10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: (H)	This site is characterized by a relatively even distribution of perennial grasses with scattered half-shrubs and is well distributed across the site and lends to slowing runoff and allowing for moderate infiltration.	Relatively even distribution of grasses with some shrubs observed. LPI monitoring resulted in 43% composition of grasses and 43% composition of shrubs, shrubs had greater presence than expected but based on observations infiltration not impacted.	N-S
11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): (S, H, B)	None.	None observed.	N-S
12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: (B)	Dominant: Warm season perennial grasses (Alkali sacaton & galleta) > Shrubs (Mound saltbush & Shadscale saltbush) Sub-dominant: Cool season perennial grasses > other half-shrubs > forbs	James' galleta (<i>Pleuraphis jamesii</i>) and Alkali sacaton (<i>Sporobolus airoides</i>) Warm season perennial grasses > shrubs desert globemallow (<i>Sphaeralcea ambigua</i>) and Mormon tea (<i>Ephedra viridis</i>). LPI resulted in 43% composition for both shrubs and grasses but based on observations from the ID team while on site it was determined that Functional Structural groups were in accordance with ESD reference sheet.	N-S
13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): (B)	All plant functional groups are adapted to survival in all but the most severe droughts. Severe winter droughts affect the shrubs the most. Severe summer droughts affect grasses the most.	Vegetation community as expected per the ESD little to no decadence observed throughout the site.	N-S

14. Average percent litter cover (%) and depth (in): (B)	Herbaceous litter is not persistent on the site.	Litter measured at 24%.	N-S
15. Expected annual-production (this is TOTAL above-ground annual production, not just forage annual-production): (B)	The expected annual total production is 125 – 175 lbs./ac.	Annual Production was estimated at 125-175 lbs/ac. Through ocular estimation.	N-S
16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site: (B)	Mound saltbush, annual buckwheats, scorpionweed, and whitestem blazingstar are native to the site but may have the potential to increase with continued disturbance. Cheatgrass, annual wheatgrass, and Russian thistle are non-native annuals that have the potential to invade the site with or without disturbance.	Russian thistle (<i>Salsola kali</i> L.), camelthorn (<i>Alhagi maurorum</i>) present but not dominating.	S-M
17. Perennial plant reproductive capability: (B)	All plants native to the site are adapted to the climate and are capable of producing seeds, stolons, and /or rhizomes during the most severe droughts.	Vegetation observed was capable of reproducing. Various age classes observed.	N-S

Indicators 4 and 5 were rated Slight to Moderate, the other eight indicators for soil and site stability were rated None to Slight; therefore, the overall rating for the Soil and Site Stability attribute was rated None to Slight. Indicators 4 and 5 were rated Slight to Moderate, the other eight indicators for hydrologic function were rated None to Slight; therefore, the overall rating for the Hydrologic Function attribute was rated None to Slight. Indicator 16 was rated Slight to Moderate, the other eight indicators associated with biotic integrity were rated None to Slight; therefore, the overall rating for the Biotic Integrity attribute was rated None to Slight.

6.2.4 Manila Wash Allotment Land Health Determination

Monitoring occurred on one key area within the Manila Wash Allotment. The monitoring data for key area MW-2 is summarized below and the overall land health determination for the Manila Wash Allotment is provided.

Standard 1: Upland Sites

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate.

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

Overall, the soils throughout key area MW-2 are functioning and in a stable condition, both soil and site stability and hydrologic function were rated overall as None to Slight. Canopy cover was measured at 14 percent, the ESD reference sheet does not specify the amount of canopy cover expected at this location. The ID team did indicate that the site would likely benefit from increased canopy cover, as bare ground was higher than expected at 62 percent exceeding the range of 25-50 percent. There were no excessive erosion or degradation to soils were observed and the soil surface structure was intact. Overall, the IIRH point to upland soils exhibiting appropriate functions for the soil type and climate, there Standard 1 is being achieved for key area MW-2 and for the Manila Wash Allotment.

Standard 2: Riparian-Wetland Sites

Objective: Riparian-wetland areas are in proper functioning condition.

Determination:

- ☐ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard
- ☒ Standard Does Not Apply

Rationale:

There are no riparian-wetland sites on BLM-managed land within the Manilla Wash Allotment; therefore, Standard 2 does not apply.

Standard 3: Desired Resource Conditions

Objective: Productive upland and riparian-wetland communities of native species exist and are maintained

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

The IIRH assessment demonstrates that soil and site stability, hydrologic function, and biotic integrity have a None to Slight departure rating overall. The plant community showed some variation from the DPC objectives. The LPI data recorded 43 percent composition of grasses, this was lower than the 65-72 percent DPC objectives. Shrubs had a 43 percent composition as well exceeding the 19-23 percent DPC objective, and forbs made up 14 percent of the composition which met the DPC objective. Canopy cover appeared to be low with only 14 percent and bare ground was higher than expected at 62 percent. Waterflow patterns were common at the key area, as expected per the reference sheet, and can influence the amount of bare ground and canopy cover.

The reference state for the Shale Upland 6-10" p.z., is a mixed grass/shrub community (see Appendix B). While the LPI data shows some departures from DPC objectives (see Table 18 below) these variations are only considered slight and are still allowing the site to function and maintain within the reference state as plant community composition has not departed enough to transition the site into a different state. Additionally, this ecological site and the development and maintenance of its plant communities are affected by natural disturbances such as drought. This area has averaged 7.6 inches over the ten-year evaluation period, while the ecological site indicates 10 inches is the normal average to maintain plant communities. As natural disturbances occur slight variations in expected DPC ranges are expected to occur. Overall the site was considered to have productive communities of native vegetations therefore Standard 3 is being achieved at key area MW-2 and for the Manila Wash Allotment.

Table 18: Key Area MW-2 Summary

MW-2: Shale Upland 6-10" p.z. (R035XB220AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	65-72%	43%
Composition of Forbs	9-12%	14%
Composition of Shrubs	19-23%	43%
Bare Ground	25-50%	62%
Canopy Cover	5-12%	14%
Basal Cover	>2%	6%
Litter Cover	0%	24%

6.3 Marcou Mesa Allotment No. 06127

The following is the Land Health Standards and Determination as to whether they are being met on the Marcou Mesa Allotment

6.3.1 Actual Use

The full permitted AUMs have been implemented on the Marcou Mesa Allotment during the evaluation period totaling 768 AUMs per year, with the exception of 2011 only 600 AUMs were utilized. Livestock grazing on the Marcou Mesa Allotment is permitted as a Section 15 Lease. Allowable AUMs are calculated on BLM-administered land only. Lease holders are billed for their maximum use available on public lands unless non-use is requested and approved.

6.3.2 Land Health Evaluation

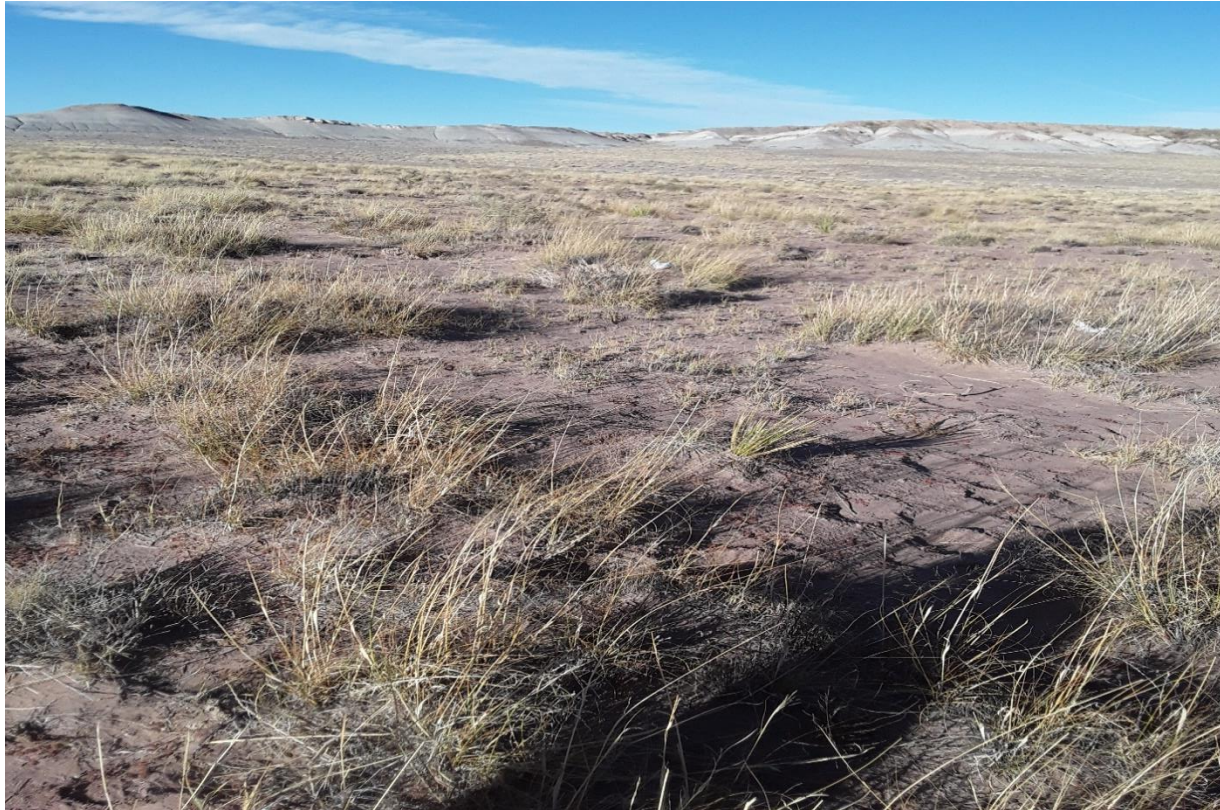
The IIRH assessment of the three rangeland health attributes was completed at key areas MM-1, and MM-2 on the Flying Butte Allotment. Ratings of Moderate or more are considered to indicate resource concerns for soil erosion, water quantity, and plant productivity. The Ratings given by the ID team are made relative to the potential for the site. For example, a site with highly erodible soils and low potential for stabilizing vegetation may be rated as having a Slight departure from reference conditions even though the actual amount of soil movement is significant, while a site with a high potential for stability rated Moderate may have relatively little soil movement. A summary of the IIRH assessment conducted at each key area is presented in [Table 19: Marcou Mesa IIRH Summary](#) below.

Table 19: Marcou Mesa IIRH Summary

Key Area	Ecological Site	Range Health Attributes – Degree of Departure		
		Soil and Site Stability	Hydrologic Function	Biotic Integrity
MM-1	Clay Loam Terrace 6-10" p.z. Sodic	None to Slight	None to Slight	None to Slight
MM-2	Sandy Upland 6-10' p.z. Sodic	None to Slight	None to Slight	None to Slight

6.3.3 Key Area MM-1, Clay Loam Terrace 6-10” p.z. Sodic, IIRH Assessment

Photo 5: Key Area MM-1 North Aspect



A summary of the ESD reference sheet and comments/observations from IIRH monitoring are provided in the table below followed by a short summary of the indicators.

Table 20: Key Area MM-1, Clay Loam Terrace 6-10” p.z. Sodic, IIRH Assessment

Clay Loam Terrace 6-10” p.z. Sodic R035XB237AZ Key Area MM-1			
Reference Sheet Indicators	Reference Sheet Description	Site Observations/Comments	Attribute Rating
1. Number and extent of rills: (S, H)	Rills may occur occasionally due to clay loam and clay textures, slow permeability, moderate to high shrink/swell (cracking) characteristics of may soils, and rare flooding. The number and length of rills will be limited by the generally low slopes on the site. Rills should be uncommon due to moderate	None observed.	N-S

	plant cover potential of the site.		
2. Presence of water flow patterns: (S, H)	Water flow patterns may be due to the slow permeability of the soil, high shrink/swell characteristics of the soils and rare flooding. Patterns should be short (less than 8') and discontinuous due to moderate plant cover potential of the site.	Waterflow patterns were observed but were small and disconnected throughout the site. Less than 8 feet in length, site was well vegetated.	N-S
3. Number and height of erosional pedestals or terracettes: (S, H)	None	None observed.	N-S
4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): (S, H)	Bare ground ranges from 35-55% and has the potential to produce a heavy amount of plant cover and litter due to an average water capacity of 10.7 inches. Drought may cause increase in bare ground.	Bare ground was measured at 62%, slight increase from the 35-55% as provided from the ESD reference sheet. This departure was as expected for currently climatic influences.	N-S
5. Number of gullies and erosion associated with gullies (S, H)	None	None observed.	N-S
6. Extent of wind scoured, blowouts and/or depositional areas: (S)	None	None observed.	N-S
7. Amount of litter movement (describe size and distance expected to travel): (S)	Herbaceous and woody litter will be transported throughout the site by water during rare flood events. Herbaceous litter will also be redistributed by wind.	Litter movement was observed within waterflow patterns.	N-S
8. Soil surface (top few mm) resistance to erosion (stability values are averages – most sites will show a range of values): (S, H, B)	Soils have moderate shrink/swell properties and cracking may be common on the surface. If cracks do occur on the surface, this process will reduce aggregate stability. When well vegetated and not subjected to severe flood events, these soils have a low to moderate resistance to water erosion and moderate resistance to wind erosion. Average Soil Site Stability are 1.5 (range 1-4), averages with canopy are 3 to 4, averages with no canopy are 1 to 2.	Soil stability tests were conducted in the interspaces and under plant canopy. Interspace Avg. 1.67 Plant canopy Avg. 2.75 More bare ground was present reducing the stability slightly but the averages for both interspace and plant canopy were as expected.	N-S
9. Soil surface structure and SOM content (include type of structure)	Soil surface structure is mostly moderate thick platy structure parting to strong very fine granular. The A-	Soil pit confirmed soil structure, no loss or degradation observed throughout site. Difficult	N-S

and A-horizon color and thickness): (S, H, B)	horizon thickness is 2-6 inches. The A-horizon did not differ significantly from the subsurface soil horizons.	to distinguish soil horizons.	
10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: (H)	This site is characterized by a relatively even distribution of grasses with scattered shrubs. There may be small patches or a light overstory of large shrubs. Vegetative canopy cover ranges from 15-35% (grasses>shrub>forbs). Basal cover ranges 5-12% (predominately grasses) for vascular plants and 0-1% for biological crust (moss>lichen>cyanobacteria). Both canopy and basal cover values decrease during a prolonged drought. This type of plant community is moderately effective at capturing and storing precipitation.	Relatively even distribution of grasses with scattered shrubs, runoff and infiltration not impacted from plant composition.	N-S
11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): (S, H, B)	None. Naturally, there would not be a compaction layer, but these soils are easily compacted when wet and disturbed. Most of the soils may be easily compacted when wet due to clay loam and clay textures, lack of rock fragments, and occasional moisture from flooding. Most soils have a naturally granular surface structure.	None observed.	N-S
12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: (B)	Dominant: Sub-dominant: perennial bunch grasses>perennial sod-forming grasses>shrubs>> Other: annual grasses = annual forbs > perennial forbs.	Alkali sacaton (<i>Sporobolus airoides</i>) perennial bunch grass > shrubs. The site was dominated by Alkali sacaton making up 89% composition and annual grasses accounted for 11% composition. No shrubs were hit during the LPI monitoring. ID team did not observe concerning conditions when out at location.	N-S
13. Amount of plant mortality and decadence (include which functional groups are expected to	All plant functional groups are adapted to survival in all but the most severe droughts. Severe winter droughts affect the shrubs the most. Severe	Little to no decadence observed throughout the site.	N-S

show mortality or decadence): (B)	summer droughts affect grasses the most.		
14. Average percent litter cover (%) and depth (in): (B)	Litter amounts increase during the first few years of drought then decrease in later years.	Litter measured at 24%.	N-S
15. Expected annual-production (this is TOTAL above-ground annual production, not just forage annual-production): (B)	Average annual production on this site is expected to be 400 to 500 lbs/ac. In a year of average annual precipitation.	Ocular estimation for annual production was 400 to 500 lbs./ac.	N-S
16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site. (B)	Broom snakeweed, mound saltbush, and greasewood are native to the site but may have the potential to increase and dominate after heavy grazing. Saltcedar, Russian knapweed, and camelthorn are non-natives that have the potential to invade the site with or without disturbance. Cheat grass is a non-native annual grass that has the potential to invade and dominate with or without disturbance. Annual wheatgrass and Russian thistle are introduced annuals that have the potential to invade after heavy continuous grazing or disturbance, especially if the site is near farm fields or disturbed lands.	Russian thistle (<i>Salsola kali</i> L.), very few observed not dominating the site.	N-S
17. Perennial plant reproductive capability: (B)	All plants native to the site are adapted to the climate and are capable of producing seeds, stolons, and/or rhizomes during the most severe droughts.	Vegetation observed was capable of reproducing. Various age classes observed.	N-S

All ten indicators for Soil and Site Stability were rated None to Slight; therefore, the overall rating for the attribute was rated None to Slight. All ten indicators for Hydrologic Function were rated None to Slight; therefore, the overall rating for the attribute was rated None to Slight. All nine indicators for Biotic Integrity were rated None to Slight; therefore, the overall rating for the attribute was rated None to Slight.

6.3.4 Key Area MM-1 Land Health Determination

Standard 1: Upland Sites

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate.

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

Overall, the soils throughout key area MM-1, are functioning and in a sustainable condition. Canopy cover and litter cover were both within the desired range and providing adequate protection of soils and allowing for acceptable permeability rates while reducing erosion. Bare ground was slightly above the desired range, but it is not expected to negatively impact the site or soils as it is an expected result during drought. Soils are exhibiting infiltration, permeability, and erosion rates that are appropriate to soil type, and climate. It was determined that Standard 1 is being achieved at key area MM-1.

Standard 2: Riparian-Wetland Sites

Objective: Riparian-wetland areas are in proper functioning condition.

Determination:

- ☐ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard
- ☒ Standard Does Not Apply

Rationale:

There are no riparian-wetland sites on BLM-managed land within the Marcou Mesa Allotment; therefore, Standard 2 does not apply.

Standard 3: Desired Resource Conditions

Objective: Productive upland and riparian-wetland communities of native species exist and are maintained

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

The IIRH assessment demonstrates that soil and site stability, hydrologic function, and biotic integrity have a None to Slight departure and the site is functioning within its expected capabilities. The table below demonstrates the monitoring data compared to the DPC objectives as established by the ESD reference sheet. The data collected from the LPI monitoring showed

that grasses had a 100 percent composition, the ID team did observe other vegetation when out in the field. The observations in the area did not raise any concerns as the site was still providing for the IIRH indicators with the plant community composition that was present, bare ground was slightly higher than expected and all other indicators were meeting the desired range for DPC objectives. It was determined Standard 3 was being achieved at key area MM-1.

Table 21: Key Area MM-1 Summary

MM-1: Clay Loam Terrace 6-10" p.z. (R035XB237AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	55-67%	100%
Composition of Forbs	0-11%	0%
Composition of Shrubs	33-34%	0%
Bare Ground	35-55%	62%
Canopy Cover	15-35%	20%
Basal Cover	5-12%	6%
Litter Cover	15-30%	24%

6.3.5 Key Area MM-2, Sandy Upland 6-10' p.z. Sodic, IIRH Assessment

Photo 6: Key Area MM-2 North Aspect



A summary of the ESD reference sheet and comments/observations from IIRH monitoring are provided in the table below followed by a short summary of the indicators.

Table 22: Key Area MM-2, Sandy Upland 6-10' p.z. Sodic, IIRH Assessment

Sandy Upland 6-10" p.z. Sodic R035XB223AZ Key Area MM-2			
Reference Sheet Indicators	Reference Sheet Description	Site Observations/Comments	Attribute Rating
1. Number and extent of rills: (S, H)	Some rills occurring on steeper slopes. An average of 4 or 5 times on a 150-foot tape with an average width of 6 inches is common.	Rills were somewhat common throughout the site. Matched ESD description.	N-S
2. Presence of water flow patterns: (S, H)	Rarely present but may occur a few times on a 150-foot tape with an average width of 1 to 2 feet.	Some waterflow patterns observed.	N-S
3. Number and height of erosional pedestals or terracettes: (S, H)	None.	None observed.	N-S
4. Bare ground from Ecological Site Description or other studies (rock,	50-75%	Bare ground was measured at 78 percent. Slightly above the 50-75% as provided in the	N-S

litter, lichen, moss, plant canopy are not bare ground): (S, H)		ESD reference sheet. The departure of 3% was not determined to be enough to change the function of the site and was considered to be slight.	
5. Number of gullies and erosion associated with gullies (S, H)	None.	Large waterflow in areas experiencing erosion, gullies not observed.	N-S
6. Extent of wind scoured, blowouts and/or depositional areas: (S)	Common, not continuous wind-scoured areas with a size less than 20x20 feet; area is mostly covered in eolian sand generally no more than about 4 inches thick.	Wind scoured areas observed.	N-S
7. Amount of litter movement (describe size and distance expected to travel): (S)	Grass and shrub litter tends to stay in place; grass seeds tend to disperse further from the plant and there are scattered areas with a small amount of herbaceous litter that has been transported by water or wind.	More litter movement was observed than expected. This was associated with Russian thistle and the litter amounts produced by this plant.	M
8. Soil surface (top few mm) resistance to erosion (stability values are averages – most sites will show a range of values): (S,H,B)	Average soil surface stability is 1-2, both under canopy and in the interspaces.	Soil stability tests were conducted in the interspaces and under plant canopy. Interspace Avg. 1.33 Plant canopy Avg. 1.83	N-S
9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): (S,H, B)	Soil textures are typically sand to loamy sand with a thickness of 1 to 4 inches. Soil surface structure is mostly single grain, loose. Some soils will have a weak medium platy. This ecological site is low in organic matter; a typical soil profile in this site lacks diagnostic soil horizons and may have a structureless sodium layer at an average depth of around 20 inches; this layer is difficult to excavate.	Soil pit confirmed soil structure. No soil loss or degradation observed. Soil horizons limited distinguishability.	N-S
10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: (H)	Shrubs are scattered throughout the site but tend to be clumped together. Herbaceous vegetation generally uniformly occurs within the interspaces. In wind-scoured areas devoid of surface sand there is generally no vegetation as this is where the sodium layer may be exposed.	Plant community as expected for the site, impacts reducing infiltration throughout the site were not observed.	N-S
11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for	This site may have a sodium affected layer between 5 and 20 inches; this layer is structureless and may be mistaken for a compaction layer as it is difficult to excavate. This salt-affected	None observed.	N-S

compaction on this site): (S, H, B)	layer may be exposed in areas where the surface sand has been scoured or blown off the soil surface.		
12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols (B)	Dominant: Warm season perennial grasses> Sub-dominant: Cool season perennial grasses >>Other: Shrub/vine > Forbs	Alkali sacaton (<i>Sporobolus airoides</i>) warm season perennial grass > shadscale saltbush (<i>Atriplex confertifolia</i>) = Annual forbs. Slightly higher presence of forbs and shrubs and lower presence of grasses. LPI data showed slight variation in plant communities but in general were as expected.	N-S
13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): (B)	There may be some evidence of plant mortality in the perennial bunchgrasses such as stem remnants and standing dead; there may also be dead material at the base of actively growing perennial bunchgrasses and shrubs. The total amount of evident plant mortality may reach as high as 10% but should not exceed that amount.	No decadence observed. Vegetation present and capable of reproducing.	N-S
14. Average percent litter cover (%) and depth (in): (B)	N/A	Litter cover was measured at 16 percent and was appropriate for the vegetation on the site.	N-S
15. Expected annual-production (this is TOTAL above-ground annual production, not just forage annual-production): (B)	Average annual production on this site is expected to be 450 to 550 lbs./ac in a year of average annual production.	Ocular estimation for annual production was 450 to 550 lbs./ac.	N-S
16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other	Invasives that can be expected in minor amounts are Russian thistle.	Russian thistle (<i>Salsola kali</i> L.) was present and not dominating the site.	S-M

indicators, we are describing what is NOT expected in the reference state for the ecological site. (B)			
17. Perennial plant reproductive capability: (B)	Natural limitations to reproductive capability are weather-related, herbivory or disease that reduces reproductive capability.	Vegetation observed was capable of reproducing. Various age classes observed.	N-S

Indicator 7 was rated as Moderate due to Russian thistle, the other nine indicators associated with Soil and Site Stability were rated None to Slight; therefore, the overall rating for the attribute was rated None to Slight. The ten indicators associated with the Hydrologic Function was rated None to Slight; therefore, the overall rating for the attribute was rated None to Slight. Indicator 16 was rated Slight to Moderate due to the presence of Russian thistle, the other eight indicators for Biotic Integrity were rated None to Slight; therefore, the overall rating for the attribute was rated None to Slight.

6.3.6 Key Area MM-2 Land Health Determination

Standard 1: Upland Sites

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate.

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

Overall, the soils throughout key area MM-2 are productive, stable and in a sustainable condition. The key area monitoring data reflects the conditions described in the ESD reference sheet and are acceptable for meeting the upland sites standard. The data from the LPI monitoring showed that perennial grasses accounted for 67 percent composition, shrubs accounted for 17 percent composition and forbs accounted for 17 percent composition. It was determined that vegetation is adequate in ensuring soil stabilization and appropriate permeability rates within the ecological site. Litter cover was measured at 16 percent the ESD reference sheet suggest a range of 5-15 percent litter cover, indicating the site is well vegetated and functioning within its capabilities. Amount of litter movement indicator #7 was rated as Moderate, The ID team observed a lot of litter movement associated with Russian thistle throughout the site predominantly wind driven. The other nine indicators associated with the Soil and Stability attribute were rated None to Slight, indicating that upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, and climate.

Standard 2: Riparian-Wetland Sites

Objective: Riparian-wetland areas are in proper functioning condition.

Determination:

- ☐ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard
- ☒ Standard Does Not Apply

Rationale:

There are no riparian-wetland sites on BLM-managed land within the Marcou Mesa Allotment; therefore, Standard 2 does not apply.

Standard 3: Desired Resource Conditions

Objective: Productive upland and riparian-wetland communities of native species exist and are maintained

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

Based on the monitoring data and evaluation of key area MM-2 it was determined that desired resource conditions are being maintained and Standard 3 is being met at this key area. The IIRH assessment demonstrates that soil and site stability, hydrologic function and biotic integrity have a None to Slight departure rating and the site is functioning within its capabilities. The data collected from the LPI monitoring shows there was a slight decrease in grasses and slight increase in both forbs and shrubs present at key area MM-2. The variation observed was not expected to impact the productivity of the ecological site as this is an expected outcome of below average rainfall the area has seen over the evaluation period. It was determined by the ID team the Standard 3 was being achieved at key area MM-2. The table below shows the DPC objectives along with the data gathered from the LPI monitoring.

Table 23: Key Area MM-2 Summary

MM-2: Sandy Upland 6-10" p.z. (R035XB223AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	80-91%	67%
Composition of Forbs	5-6%	17%
Composition of Shrubs	3-15%	17%
Bare Ground	50-75%	78%
Canopy Cover	17-39%	12%

Basal Cover	6-13%	4%
Litter Cover	5-15%	16%

6.3.7 Marcou Mesa Allotment Land Health Determination

Monitoring occurred on two key areas within the Marcou Mesa Allotment, land health determinations were provided for these two key areas and the overall determination for the Marcou Mesa Allotment is provided below based on the individual assessments of each of the key areas within the allotment.

Standard 1: Upland Sites

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate.

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale: Key Areas MM-1 and MM-2 were determined to be meeting Standard 1 and therefore the Marcou Mesa Allotment is meeting the standard.

Standard 2: Riparian-Wetland Sites

Objective: Riparian-wetland areas are in proper functioning condition.

Determination:

- ☐ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard
- ☒ Standard Does Not Apply

Rationale:

There are no riparian-wetland sites on BLM-managed land within the Marcou Mesa Allotment; therefore, Standard 2 does not apply.

Standard 3: Desired Resource Conditions

Objective: Productive upland and riparian-wetland communities of native species exist and are maintained

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale: Key Areas MM-1 and MM-2 were determined to be meeting Standard 3 and therefore the Marcou Mesa Allotment is meeting the standard

6.4 Marcou Mesa East Allotment No. 01695

The following is the Land Health Standards and Determination as to whether they are being met on the Marcou Mesa East Allotment

6.4.1 Actual Use

The Marcou Mesa East Allotment is authorized for 173 total AUMs, the allotment record has bills dating back to 2016. At one point the Marcou Mesa East Allotment used to be part of the Marcou Mesa Allotment but was split up. The allotment has been billed for 168 AUMs since 2016, the remaining 5 AUMs have been non-use, and this is likely due to an error in the Rangeland Administration System (RAS).

6.4.2 Land Health Evaluation

The IIRH assessment of the three rangeland health attributes was completed at key area MME-1, ratings of Moderate or more are considered to indicate resource concerns for soil erosion, water quantity, and plant productivity. The ratings given by the ID team are made relative to the potential for the site. For example, a site with highly erodible soils and low potential for stabilizing vegetation may be rated as having a Slight departure from reference conditions even though the actual amount of soil movement is significant, while a site with a high potential for stability rated Moderate may have relatively little soil movement. A summary of the IIRH assessment conducted at key area MME-1 is presented in [Table 24: Marcou Mesa East IIRH Summary](#) below.

Table 24: Marcou Mesa East IIRH Summary

Key Area	Ecological Site	Range Health Attributes – Degree of Departure		
		Soil and Site Stability	Hydrologic Function	Biotic Integrity
MME-1	Shale Upland 6-10” p.z.	Slight to Moderate	Slight to Moderate	None to Slight

6.4.3 Key Area MME-1, Shale Upland 6-10" p.z., IIRH Assessment

Photo 7: Key Area MME-1 Looking North



A summary of the ESD reference sheet and comments/observations from IIRH monitoring are provided in the table below followed by a short summary of the indicators.

Table 25: Key Area MME-1, Shale Upland 6-10" p.z., IIRH Assessment

Shale Upland 6-10" p.z. R035XB220AZ Key Area MME-1			
Reference Sheet Indicators	Reference Sheet Description	Site Observations/Comments	Attribute Rating
1. Number and extent of rills: (S, H)	Somewhat common, especially on steepest slopes. Rills less than 10 feet long due to fine textured soils and scattered perennial plant cover. Sites armored with coarse fragments (gravel and channers) will have shorter rills and less frequent.	Rills observed on mostly exposed areas, rills were associated with gullies and were short in length.	N-S
2. Presence of water flow patterns: (S, H)	Somewhat common throughout site. Water flow patterns may be long with low sinuosity and connected on steeper	Waterflow patterns were frequent and connected and occurred more than as described in ESD reference sheet.	S-M

	slopes. Sites armored with coarse fragments will have less evidence of flow patterns, but still common. Water flow patterns will show signs of deposition.		
3. Number and height of erosional pedestals or terracettes: (S, H)	Some long-lived plants may show some slight pedestals of less than ½" on slopes. Terracettes are few.	Pedestals and terracettes observed in higher frequency than expected.	S-M
4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): (S, H)	Expected bare ground ranges from 25-50% depending on surface fragments. Well developed, intact biological crust should not be counted as bare ground.	Bare ground measured at 38%, the ESD reference sheet suggest 35-50%.	N-S
5. Number of gullies and erosion associated with gullies (S, H)	None to very few. When site is well vegetated and covered with rock fragments gullies are stable and will only show minor signs of active erosion.	Gullies present, moderate depth observed, no headcuts and active erosion present.	S-M
6. Extent of wind scoured, blowouts and/or depositional areas: (S)	Deposition and blowouts by wind are not expected.	Uncommon to rare, very few seen.	N-S
7. Amount of litter movement (describe size and distance expected to travel): (S)	Litter movement or redistribution by water is common and expected in water flow patterns. Some litter removal in water flow patterns is expected.	Litter movement observed throughout the site.	N-S
8. Soil surface (top few mm) resistance to erosion (stability values are averages – most sites will show a range of values): (S, H, B)	The expected average soil stability is 3 or 4. Surface fragments, litter, and vegetation cover aid in reducing erosion.	Soil stability tests were conducted in the interspaces and under plant canopy. Interspace Avg. 1.8 Canopy Avg. 2.5	S-M
9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): (S, H, B)	Soil surface horizon is 2 to 4 inches deep. Structure is mostly weak thin platy parting to moderate very fine granular structure.	Soil pit confirmed soil structure, no soil loss or degradation observed.	N-S
10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: (H)	This site is characterized by a relatively even distribution of perennial grasses with scattered half-shrubs and is well distributed across the site and lends to slowing runoff and allowing for moderate infiltration.	Relatively even distribution of grasses with shrubs. No impacts to infiltration observed throughout the site. The site is capable of moderately capturing and storing precipitation.	N-S
11. Presence and thickness of compaction layer	None.	None observed.	N-S

(usually none; describe soil profile features which may be mistaken for compaction on this site): (S, H, B)			
12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols (B))	Dominant: Warm season perennial grasses (Alkali sacaton & galleta) > Shrubs (Mound saltbush & Shadscale saltbush) Sub-dominant: Cool season perennial grasses > other half-shrubs > forbs	Alkali sacaton (<i>Sporobolus airoides</i>), James' galleta (<i>Pleuraphis jamesii</i>) warm season perennial grasses > shrubs, Mormon tea (<i>Ephedra viridis</i>) > Annual Forbs.	N-S
13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): (B)	All plant functional groups are adapted to survival in all but the most severe droughts. Severe winter droughts affect the shrubs the most. Severe summer droughts affect grasses the most.	Some decadence observed but not impacting vegetation community.	N-S
14. Average percent litter cover (%) and depth (in): (B)	Herbaceous litter is not persistent on the site.	Litter measured at 26%.	N-S
15. Expected annual-production (this is TOTAL above-ground annual production, not just forage annual-production): (B)	The expected annual total production is 125 – 175 lbs./ac.	Ocular estimation of annual production >175 lbs./ac.	S-M
16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site. (B)	Mound saltbush, annual buckwheats, scorpionweed, and whitestem blazingstar are native to the site but may have the potential to increase with continued disturbance. Cheatgrass, annual wheatgrass, and Russian thistle are non-native annuals that have the potential to invade the site with or without disturbance.	Broom snakeweed (<i>Gutierrezia sarothrae</i>) present but not dominating.	N-S

17. Perennial plant reproductive capability: (B)	All plants native to the site are adapted to the climate and are capable of producing seeds, stolons, and /or rhizomes during the most severe droughts.	Vegetation observed was capable of reproducing. Various age classes observed, Seed heads present	N-S
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Indicators 2, 3, 5, and 8 were rated Slight to Moderate, the other six indicators associated with soil and site stability were rated None to Slight; the overall rating for the Soil and Site Stability attribute was rated as Slight to Moderate. Indicators 2, 3, 5, and 8 were rated Slight to Moderate, the other six indicators associated with the hydrologic function were rated None to Slight; the overall rating for the Hydrologic Function attribute was rated Slight to Moderate. Indicators 8 and 15 were rated Slight to Moderate; the other seven indicators associated with the biotic integrity attribute were rated None to Slight; the overall rating for the Biotic Integrity attribute was rated None to Slight.

6.4.4 Marcou Mesa East Allotment Land Health Determination

Monitoring occurred on one key area within the Marcou Mesa East Allotment. The monitoring data for key area MME-1 is summarized below and the overall land health determination for the Marcou Mesa East Allotment is provided.

Standard 1: Upland Sites

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate.

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

The soils characteristics throughout key area MME-1 were determined to be functioning. Canopy cover was measured at 32 percent. The ESD reference sheet does not specify the amount of canopy cover expected at this location, it was determined that the site is most likely reaching or even exceeding the average amount of canopy cover, this would agree with Indicator 15 of the IIRH assessment which showed a higher estimation of annual production than expected. Litter cover was measured at 26 percent, the amount of litter cover was determined to be adequate for the site and again reaching the upper limits of what is expected. Bare ground was measured at 38 percent and fell within the expected range as provided in the ESD reference sheet. All of these factors are important in establishing and maintaining soil infiltration, permeability and erosion rates. The IIRH assessment showed some Slight to Moderate departure ratings for both Soil and Site Stability and Hydrologic Function, ratings of Moderate or above can be cause for resource concern. It was determined that overall Standard 1 was being achieved for key area MME-1 and for the Marcou Mesa East Allotment.

Standard 2: Riparian-Wetland Sites

Objective: Riparian-wetland areas are in proper functioning condition.

Determination:

- ☐ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard
- ☒ Standard Does Not Apply

Rationale:

There are no riparian-wetland sites on BLM-managed land within the Marcou Mesa East Allotment; therefore, Standard 2 does not apply

Standard 3: Desired Resource Conditions

Objective: Productive upland and riparian-wetland communities of native species exist and are maintained

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

IIRH assessment showed that Soil and Site Stability and Hydrologic Function had an overall Slight to Moderate departure rating, and the overall rating for Biotic Integrity showed a None to Slight departure. Ratings of Moderate or more are considered to indicate resource concerns, key area MME-1 did not have any indicators in this category. The LPI data gathered from key area MME-1 (shown in the table below) shows some variation in species composition but not enough to impact the capability of the site. Grasses had a higher composition than expected at 82 percent exceeding the 65-72 percent range as provided in the ESD reference sheet, forbs were slightly lower than expected at 6 percent, with an ideal range of 9-12 percent, and lastly shrubs made up 12 percent of the species composition falling short of the 19-23 percent as provided in the ESD reference sheet. The species composition showed some slight deviation but generally speaking the functional structural groups were as expected and are allowing the site to function. Canopy cover was measured at 32 percent and basal cover was 10 percent, although the ESD reference sheet did not specify the expected amount for either cover class, it was determined that there is an adequate amount to ensure proper infiltration, permeability, and erosion rates by providing soil protection. Overall the LPI and IIRH show a productive upland with plant communities capable of maintaining native species appropriate for the site, Standard 3 is being achieved at key area MME-1 and for the Marcou Mesa East Allotment.

Table 26: Key Area MME-1 Summary

MME-1: Shale Upland 6-10" p.z. (R035XB220AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	65-72%	82%
Composition of Forbs	9-12%	6%
Composition of Shrubs	19-23%	12%
Bare Ground	25-50%	38%
Canopy Cover	5-12%	32%
Basal Cover	>2%	10%
Litter Cover	0%	26%

6.5 Mesa Wash Allotment No. 06172

The following is the Land Health Standards and Determination as to whether they are being met on the Mesa Wash Allotment.

6.5.1 Actual Use

The Mesa Wash Allotment is authorized for 60 AUMs with year-long grazing. Livestock grazing on the Mesa Wash allotment is permitted as a Section 15 Lease. Allowable AUMs are calculated on BLM-administered land only/ Lease holders are billed for their maximum use available on public land unless non-use is requested and approved. The allotment has utilized full use at 60 AUMs per year through the course of this evaluation.

6.5.2 Land Health Evaluation

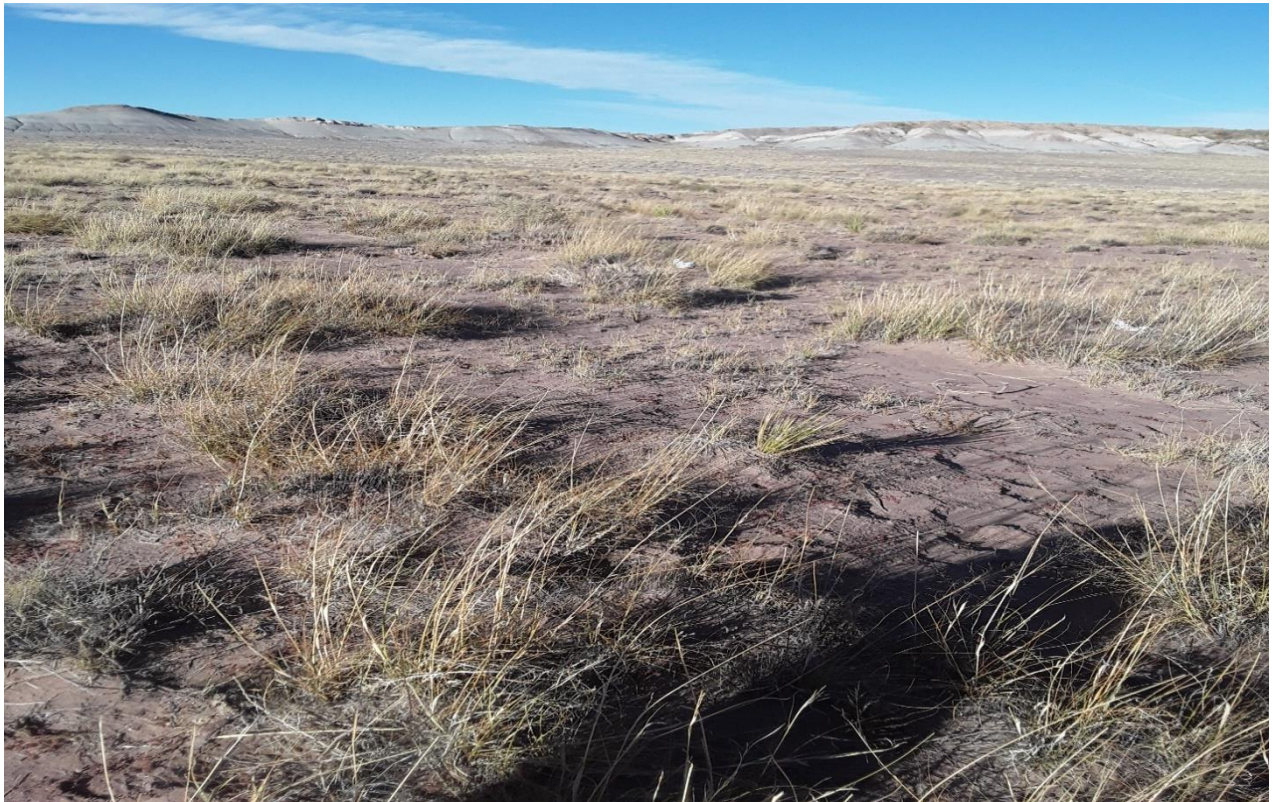
The IIRH assessment of the three rangeland health attributes was completed at key area Mesa Wash-1, ratings of Moderate or more are considered to indicate resource concerns for soil erosion, water quantity, and plant productivity. The ratings given by the ID team are made relative to the potential for the site. For example, a site with highly erodible soils and low potential for stabilizing vegetation may be rated as having a Slight departure from reference conditions even though the actual amount of soil movement is significant, while a site with a high potential for stability rated Moderate may have relatively little soil movement. A summary of the IIRH assessment conducted at key area Mesa Wash-1 is presented in [*Table 27: Mesa Wash IIRH Summary*](#) below.

Table 27: Mesa Wash IIRH Summary

Key Area	Ecological Site	Range Health Attributes – Degree of Departure		
		Soil and Site Stability	Hydrologic Function	Biotic Integrity
Mesa Wash-1	Sandy Upland 6-10” p.z. Sodic	Slight to Moderate	Slight to Moderate	None to Slight

6.5.3 Key Area Mesa Wash-1, Sandy Upland 6-10” p.z. Sodic, IIRH Assessment

Photo 8: Key Area Mesa Wash-1 North Aspect



A summary of the ESD reference sheet and comments/observations from IIRH monitoring are provided in the table below followed by a short summary of the indicators.

Table 27: Key Area Mesa Wash-1, Sandy Upland 6-10" p.z. Sodic, IIRH Assessment

Sandy Upland 6-10" p.z. Sodic R035XB223AZ Key Area Mesa Wash-1			
Reference Sheet Indicators	Reference Sheet Description	Site Observations/Comments	Attribute Rating
1. Number and extent of rills: (S, H)	Some rills occurring on steeper slopes. An average of 4 or 5 times on a 150-foot tape with an average width of 6 inches is common.	Rills more frequent and wider than 6 inches.	S-M
2. Presence of water flow patterns: (S, H)	Rarely present but may occur a few times on a 150-foot tape with an average width of 1 to 2 feet.	Waterflow patterns observed and more frequent than described.	M
3. Number and height of erosional pedestals or terracettes: (S, H)	None.	None observed.	N-S
4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): (S, H)	50-75%	Bare ground measured at 64% and was within the 50-75% range.	N-S
5. Number of gullies and erosion associated with gullies: (S, H)	None.	None observed.	N-S
6. Extent of wind scoured, blowouts and/or depositional areas: (S)	Common, not continuous wind-scoured areas with a size less than 20x20 feet; area is mostly covered in eolian sand generally no more than about 4 inches thick.	Wind scoured areas observed throughout the site.	N-S
7. Amount of litter movement (describe size and distance expected to travel): (S)	Grass and shrub litter tends to stay in place; grass seeds tend to disperse further from the plant and there are scattered areas with a small amount of herbaceous litter that has been transported by water or wind.	Litter movement observed in waterflow patterns and from wind deposition.	N-S
8. Soil surface (top few mm) resistance to erosion (stability values are averages – most sites will show a range of values): (S, H, B)	Average soil surface stability is 1-2, both under canopy and in the interspaces.	Soil stability tests were conducted in the interspaces and under plant canopy. Interspace Avg. 1.2 Plant canopy Avg. 1.4	N-S

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): (S, H, B)	Soil textures are typically sand to loamy sand with a thickness of 1 to 4 inches. Soil surface structure is mostly single grain, loose. Some soils will have a weak medium platy. This ecological site is low in organic matter; a typical soil profile in this site lacks diagnostic soil horizons and may have a structureless sodium layer at an average depth of around 20 inches; this layer is difficult to excavate.	Soil pit confirmed soil structure, soil loss and degradation not observed.	N-S
10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: (H)	Shrubs are scattered throughout the site but tend to be clumped together. Herbaceous vegetation generally uniformly occurs within the interspaces. In wind-scoured areas devoid of surface sand there is generally no vegetation as this is where the sodium layer may be exposed.	Grass dominated site with presence of shrubs, no excessive erosion vegetation community capable of reducing runoff and allowing for infiltration within the site's capability.	N-S
11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): (S, H, B)	This site may have a sodium affected layer between 5 and 20 inches; this layer is structureless and may be mistaken for a compaction layer as it is difficult to excavate. This salt-affected layer may be exposed in areas where the surface sand has been scoured or blown off the soil surface.	None.	N-S
12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: (B)	Dominant: Warm season perennial grasses> Sub-dominant: Cool season perennial grasses >>Other: Shrub/vine > Forbs	Alkali grass dominant with shrub presence throughout the site.	N-S
13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): (B)	There may be some evidence of plant mortality in the perennial bunchgrasses such as stem remnants and standing dead; there may also be dead material at the base of actively growing perennial bunchgrasses and shrubs. The total amount of evident plant mortality may reach	Alkali sacaton (<i>Sporobolus airoides</i>), James' galleta (<i>Pleuraphis jamesii</i>) warm season grass > shadscale saltbush (<i>Atriplex confertifolia</i>) shrubs > Annual Forbs.	N-S

	as high as 10% but should not exceed that amount.		
14. Average percent litter cover (%) and depth (in): (B)	N/A	Litter was measured at 14%.	N-S
15. Expected annual-production (this is TOTAL above-ground annual production, not just forage annual-production): (B)	Average annual production on this site is expected to be 450 to 550 lbs./ac in a year of average annual production.	Ocular estimation for annual production at 450 lbs./ac.	N-S
16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site: (B)	Invasives that can be expected in minor amounts are Russian thistle.	Russian thistle (<i>Salsola kali</i>) present but not a dominating vegetation component.	N-S
17. Perennial plant reproductive capability: (B)	Natural limitations to reproductive capability are weather-related, herbivory or disease that reduces reproductive capability.	Vegetation observed was capable of reproducing. Various age classes observed.	N-S

Indicator 1 was rated Slight to Moderate and Indicator 2 was rated Moderate, the other eight indicators associated with Soil and Site Stability were rated None to Slight; the overall rating for the attribute was rated Slight to Moderate. Indicator 1 was rated Slight to Moderate and Indicator 2 was rated Moderate, the other eight indicators associated with Hydrologic Function were rated None to Slight; the overall rating for the attribute was rated Slight to Moderate. All ten indicators for Biotic Integrity were rated None to Slight; therefore, the overall rating for the attribute was None to Slight.

6.5.4 Mesa Wash Allotment Land Health Determination

Monitoring occurred on one key area within the Mesa Wash Allotment. The monitoring data for key area Mesa Wash-1 is summarized below and the overall land health determination for the Mesa Wash allotment is provided.

Standard 1: Upland Sites

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate.

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

The soil characteristics at key area Mesa Wash-1 were determined to be functioning. Canopy cover was measured at 22 percent and basal cover was measured at 8 percent, based on observations it was determined that both canopy and basal cover is adequate to ensure proper infiltration and permeability while providing appropriate cover to reduce erosion rates. Litter cover was within the ESD reference sheet parameters along with bare ground further indicating functional upland soils. The IIRH assessment showed an overall Slight to Moderate departure rating for Soil and Site Stability, and Hydrologic Function, this was due to the presence of rills and water flow patterns at the key area, ratings of Moderate or more can be cause for resource concern. Overall the data gathered from IIRH and LPI monitoring did not indicate more than a slight departure from the ESD reference sheet, and it was determined that Standard 1 was being achieved for key area Mesa Wash-1 and for the Mesa Wash Allotment.

Standard 2: Riparian-Wetland Sites

Objective: Riparian-wetland areas are in proper functioning condition.

Determination:

- ☐ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard
- ☒ Standard Does Not Apply

Rationale:

There are no riparian-wetland sites on BLM-managed land within the Mesa Wash Allotment; therefore, Standard 2 does not apply. See Section 2.2.5 for further discussion specific to the Mesa Wash Allotment.

Standard 3: Desired Resource Conditions

Objective: Productive upland and riparian-wetland communities of native species exist and are maintained

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

IIRH assessment showed the overall rating for Soil and Site Stability, Hydrologic Function and Biotic Integrity was None to Slight. The DPC objectives specific to plant community composition and structural groups (see table below) were either meeting or had such slight little change from what was expected from the ESD reference sheet that the site was determined to be meeting composition objectives. DPC objectives for cover classes were also meeting objectives for the site. Results from IIRH and LPI indicate that established DPC objectives are being met and allowing for a productive upland of native plant communities to exist and be maintained, therefore, Standard 3 is being achieved at key area Mesa Wash-1 and for the Mesa Wash Allotment.

Table 28: Key Area Mesa Wash-1 Summary

Mesa Wash-1: Sandy Upland 6-10" p.z. (R035XB223AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	80-91%	75%
Composition of Forbs	5-6%	8%
Composition of Shrubs	3-15%	17%
Bare Ground	50-75%	64%
Canopy Cover	17-39%	22%
Basal Cover	6-13%	8%
Litter Cover	5-15%	16%

6.6 Pipeline Allotment No. 06149

The following is the Land Health Standards and Determination as to whether they are being met on the Pipeline Allotment.

6.6.1 Actual Use

The Pipeline Allotment is authorized for 108 AUMs with year-long grazing. Livestock grazing on the Pipeline Allotment is permitted as a Section 15 Lease. Allowable AUMs are calculated on BLM-administered land only. Lease holders are billed for their maximum use available on public land unless non-use is requested and approved. The allotment has utilized full use at 108 AUMs per year through the course of this evaluation.

6.6.2 Land Health Evaluation

The IIRH assessment of the three rangeland health attributes was completed at key area PL-1, ratings of Moderate or more are considered to indicate resource concerns for soil erosion, water quantity, and plant productivity. The ratings given by the ID team are made relative to the potential for the site. For example, a site with highly erodible soils and low potential for stabilizing vegetation may be rated as having a Slight departure from reference conditions even though the actual amount of soil movement is significant, while a site with a high potential for stability rated Moderate may have relatively little soil movement. A summary of the IIRH assessment conducted at key area Mesa Wash-1 is presented in [Table 30: Pipeline IIRH Summary](#) below.

Table 29: Pipeline IIRH Summary

Key Area	Ecological Site	Range Health Attributes – Degree of Departure		
		Soil and Site Stability	Hydrologic Function	Biotic Integrity
PL-1	Mudstone/Sandstone Hills 6-10” p.z.	None to Slight	None to Slight	Slight to Moderate

6.6.4 Key Area PL-1, Mudstone/Sandstone Hills 6-10” p.z., IIRH Assessment

Photo 9: Key Area PL-1 North Aspect



A summary of the ESD reference sheet and comments/observations from IIRH monitoring are provided in the table below followed by a short summary of the indicators.

Table 30: Key Area PL-1, Mudstone/Sandstone Hills 6-10" p.z., IIRH Assessment

Mudstone/Sandstone Hills 6-10" p.z R035XB201AZ Key Area PL-1			
Reference Sheet Indicators	Reference Sheet Description	Site Observations/Comments	Attribute Rating
1. Number and extent of rills: (S, H)	A few rills occur throughout site (1-10% cover) at infrequent intervals, mostly in exposed areas. Rills may be 8 or more feet in length and are likely to form below or adjacent exposed bedrock or areas where surface rock fragments are less than 15%. The number of rill and extent will increase on slopes greater than 35%, or sites with a decrease of herbaceous cover and/or immediately following high intensity storm events.	Some rills observed throughout the site but not very frequent.	N-S
2. Presence of water flow patterns: (S, H)	The occurrence of water flow patterns is frequent (5-10% cover) and occur throughout the site interspersed throughout the larger rock fragments. These waterflow patterns are typically less than 6 feet long. As slope increase (>15%) water flow pattern occurrence and length increases. A temporary increase in water flow patterns is also expected following high intensity storm events.	Water flow patterns observed, steeper slopes associated with the site resulting in larger flow patterns.	N-S
3. Number and height of erosional pedestals or terracettes: (S, H)	Some slight pedestalling (1-2" inch) can occur at the base of plants and rocks as a result of natural wind and water erosion in the reference state; however, terracettes are uncommon and occur only in flow paths. On steeper slopes (>35%), pedestalling and terracettes can be at	Few pedestals observed and no terracettes observed.	N-S

	moderate amounts with no exposed roots.		
4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): (S, H)	20 to 40% bare ground depending on rock and gravel cover. Bare areas are moderate in size but are rarely connected.	Bare ground measured at 12% higher presence of rock fragments on the surface resulting in less bare ground.	N-S
5. Number of gullies and erosion associated with gullies: (S, H)	Gullies can occur in deeper soil with less rock cover with occasional headcuts on steeper slopes. There are numerous large drainages on this site that are stable; lined with bedrock and intermittent vegetation.	Gullies were observed, associated with steeper slopes.	N-S
6. Extent of wind scoured, blowouts and/or depositional areas: (S)	None.	None.	N-S
7. Amount of litter movement (describe size and distance expected to travel): (S)	Most herbaceous and fine woody litter will be transported and concentration by wind and water in flow pathways and around obstructions, while a very small percentage stays in place. Coarse woody litter (>1/4" diameter) and duff will accumulate under shrub canopies.	Litter movement observed in water flow patterns.	N-S
8. Soil surface (top few mm) resistance to erosion (stability values are averages – most sites will show a range of values): (S, H, B)	This site should have an average soil stability rating of 4 throughout the site. Surface texture varies from sandy loam to gravelly/cobbly loam.	Soil stability tests were conducted in the interspaces and under plant canopy. Interspaces Avg. 1.5 Plant canopy Avg. 3.4	S-M
9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): (S, H, B)	Soil surface varies from 2 to 4 inches. Structure is generally weak thin platy. Color is reddish brown (2.5YR 5/4). The A horizon will show minimal difference in structure and depth between interspaces and under plant canopies.	Soil pit confirmed soil structure, no loss or degradation observed to soil horizons, minimal differences observed in horizons difficult to tell apart.	N-S
10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: (H)	This site is characterized by a relatively even distribution of mostly perennial grasses and low shrubs across the landscape. Canopy and basal cover are dominated by warm season grasses	Shrubs accounted for 44% of the species composition slightly exceeding the 36-41% composition as derived from the ESD reference sheet., even distribution of grasses observed.	N-S

	and evergreen shrubs. Both plant cover values (especially basal) decrease during prolonged summer drought. This type of plant community along with surface rock cover and slopes are somewhat effective at capturing and storing precipitation.	Impacts to infiltration were not observed and a N-S departure rating was deemed appropriate.	
11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): (S, H, B)	None. These soils are not easily compacted due to cover of rock fragments and the volume of rock fragments in the subsurface horizons of the profile.	None observed.	N-S
12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: (B)	Dominant: Evergreen shrubs (25-35%) > Warm season colonizing grasses (15-20%) = Cool season bunch grasses (15-20%) Sub-dominant: Deciduous shrubs (5-15%) > Warm season bunch grasses (5-10%) forbs (5-10%) Other: Cacti (0-3%)	Broom snakeweed (<i>Gutierrezia sarothrae</i>) rubber rabbitbrush (<i>Ericameria nauseosa</i>) evergreen shrubs > warm season grasses James' galleta (<i>Pleuraphis jamesii</i>) and Threeawn (<i>Aristida spp.</i>).	N-S
13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): (B)	In a normal year up to 10 to 15% of grasses and shrubs die off. During and after drought years there can be from 10 to 25% die off of shrubs and grasses. Severe winter droughts affect shrubs, and cool season grasses the most. Severe summer droughts affect the warm season grasses the most.	Some decadence observed vegetation capable of reproducing.	N-S
14. Average percent litter cover (%) and depth (in): (B)	Within plant interspaces litter ranges from 0 to 10% cover with no real depth, while under shrub canopies it ranges from 20 to 40% cover with depths from 1/8 to 1/2 inches thick. Litter amounts increase during the first few years of drought, then decrease in later years.	Litter cover measured at 14% accumulation observed under shrubs, slightly below 20-40% as provided.	N-S
15. Expected annual-production (this is TOTAL above-ground annual production, not just forage annual-production): (B)	Average annual production on this site is expected to be 300 to 400lbs/ac. In a year of average annual precipitation.	Ocular estimation at 300 to 400 lbs./ac.	N-S

16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site: (B)	Non-native species that can invade and establish on this site are cheat grass and Russian thistle. Native species such as James' galleta, broom snakeweed, rabbitbrush and Mormon tea are native to the site, but can increase with disturbance.	Broom snakeweed (<i>Gutierrezia sarothrae</i>), rubber rabbitbrush (<i>Ericameria nauseosa</i>), camelthorn (<i>Alhagi maurorum</i>), Saltcedar (<i>Tamarisk spp.</i>) and cocklebur (<i>Xanthium strumarium</i>). Present but not dominating.	M
17. Perennial plant reproductive capability: (B)	All plants native to this site are adapted to the climate and are capable of producing seeds, stolons and rhizomes except during the most severe droughts.	Vegetation observed was capable of reproducing. Various age classes observed.	N-S

Indicator 8 was rated Slight to Moderate, the other nine indicators associated with Soil and Site Stability were rated None to Slight; therefore, the overall rating for the attribute was rated None to Slight. Indicator 8 was rated Slight to Moderate, the other nine indicators associated with Hydrologic Function were rated None to Slight, the overall rating for the attribute was rated None to Slight. Indicator 8 was rated Slight to Moderate and Indicator 16 was rated Moderate, the other seven indicators associated with the Biotic Integrity attribute were rated None to Slight, the overall rating for was Slight to Moderate.

6.6.4 Pipeline Allotment Land Health Determination

Monitoring occurred on one key area within the Pipeline Allotment. The monitoring data for key area PL-1 is summarized below and the overall land health determination for the Pipeline Allotment is provided.

Standard 1: Upland Sites

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate.

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

The soil characteristics at key area PL-1 were determined to be functioning. Cover amounts indicated through canopy and basal were in expected ranges. Litter cover was measured at 14 percent and fell within the range of 0-40 percent as provided in the ESD reference sheet. Bare ground at 12 percent was slightly below the 20-40 percent expected range. All of these attributes indicate that soils had adequate cover and armoring to allow for appropriate infiltration and permeability, the site is also not displaying to a disproportionate rate of erosion. The IIRH assessment showed a None to Slight departure rating for both Hydrologic Function, and Soil and Site Stability. It was determined that Standard 1 was being achieved at key area PL-1 and for the Pipeline Allotment.

Standard 2: Riparian-Wetland Sites

Objective: Riparian-wetland areas are in proper functioning condition.

Determination:

- ☐ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard
- ☒ Standard Does Not Apply

Rationale:

There are no riparian-wetland sites on BLM-managed land within the Pipeline Allotment; therefore, Standard 2 does not apply.

Standard 3: Desired Resource Conditions

Objective: Productive upland and riparian-wetland communities of native species exist and are maintained

Determination:

- ☒ Meeting the Standard
- ☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
- ☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

The IIRH assessment showed that Biotic Integrity had an overall departure rating of Slight to Moderate. The site had a few plant species that are either considered invasive or have the potential to become invasive. The plant species present that could potentially become invasive are not currently dominating the site or impacting the area. The DPC objectives specific to plant community composition had some variation from the ESD reference sheet. The LPI data showed that grasses accounted for 33 percent of the species composition, which is slightly lower than the

desired 50-64 percent range. Forbs had a slight increase at 22 percent composition and exceeded the 0-9 percent desired range, and shrubs slightly exceeded the 36-41% desired range, at 44 percent. Native species and grasses were observed throughout the site and are present and capable of reproducing. Although the DPC objectives had some variation it was determined that the site is functioning within its capabilities. The site is characterized as having a relatively even distribution of perennial grasses and low shrubs across the landscape, the LPI data reflects this and although grasses had a slightly lower composition than expected the site is not in danger of becoming shrub dominated. It was determined that native species exist and are being maintained and Standard 3 is being achieved at key area PL-1 and for the Pipeline Allotment. The table below summarizes the objectives and the results of the LPI data

Table 31: Key Area PL-1 Summary

PL-1: Mudstone/Sandstone Hills 6-10" p.z. (R035XB201AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	50-64%	33%
Composition of Forbs	0-9%	22%
Composition of Shrubs	36-41%	44%
Bare Ground	20-40%	12%
Canopy Cover	10-31%	18%
Basal Cover	4-10%	4%
Litter Cover	0-40%	14%

7.0 Recommended Management Actions

Based on the determination and the evaluation of each key area the following management actions are recommended:

1. Grazing management on the five allotments in the Evaluation Area will continue in accordance with the term leases as follows:

Table 32: Recommended Management Actions

Allotment Name/Number	Livestock Number/Kind	Grazing period Begin - End	% Public Land	Active Use (AUM)
Flying Butte (No. 06074)	53 Cattle	3/1 – 2/28	100	636
Manila Wash (No. 06017)	5 Cattle	3/1-2/28	100	60
Marcou Mesa (No. 06127)	64 Cattle	3/1-2/28	100	768
Marcou Mesa East (No. 01695)	14 Cattle	3/1-2/28	100	173
Mesa Wash (No. 06172)	5 Cattle	3/1-2/28	100	60

2. The following “Other Terms and Conditions” should be added to each lease:
 - In order to improve livestock distribution on the public lands, all salt blocks and/or mineral supplements shall not be placed within a ¼ mile of any riparian area, wet meadow or watering facility (either permanent or temporary) unless stipulated through a written agreement or decision in accordance with 43 CFR 4130.3-2(C).
 - The lessee shall submit, upon request, a report of the actual grazing use made on this allotment for the previous grazing period, March 1 to February 28. Failure to submit such a report by March 15 of the current year may result in suspension or cancellation of the grazing lease.
 - Lessee shall provide reasonable administrative access across private and leased lands to the BLM for the orderly management and protection of the public lands.
3. The following “Other Terms and Conditions” should be deleted as they are duplicates of the Standard Terms and Conditions associated with all BLM leases, and/or are no longer applicable:
 - In accordance with 43 CFR 4130.8-1(F): Failure to pay grazing bills within 15 days of the due date specified in the bill shall result in a late fee assessment of \$25.00 or 10 percent of the grazing bill, whichever is greater, but not to exceed \$250.00. Payment made later than 15 days after the due date, shall include the appropriate late fee assessment. Failure to make payment within 30 days may be a violation of 43 CFR Secs. 4150.1 and 4160.1-2.

- If in connection with allotment operations under this authorization, any human remains, funerary objects, sacred objects or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (P.L. 101-601; 104 Stat. 3048; U.S.C. 3001) are discovered, the Permittee shall stop operations in the immediate area of the discovery, protect the remains and objects, and immediately notify the Authorized Officer of the discovery. The Permittee shall continue to protect the immediate area of the discovery until notified by the Authorized Officer that operations may resume.
- As a term and condition of this permit you are required to submit a report of actual grazing use made on this allotment for the previous grazing period March 1 to Feb. 28. Failure to submit this report by March 1, of this year, may result in suspension or cancellations of grazing permit.
- In accordance with SEC. 325, title iii, H.R. 2691, Department of the Interior and related agencies appropriations act, 2004 (p.l. 108-108), which was enacted on November 10, 2003, this grazing permit or lease is renewed under section 402 of the Federal Land Policy and Management act of 1976, as amended (43 u.s.c. 1752), title iii of the Bankhead-Jones Farm Tenant Act (7 U.S.C. 1010 et seq.), or, if applicable, Section 510 of the California Desert Protection Act (16 U.S.C. 410aaa-50). in accordance with public law 108-108 the terms and conditions contained in the expired or transferred permit or lease AND shall continue in effect under the renewed permit or lease until such time as the secretary of the interior completes processing of this permit or lease in compliance with all applicable laws and regulations, at which time this permit or lease may be canceled, suspended, or modified, in whole or in part, to meet the requirements of such applicable laws and regulations.
- Grazing fee payment are due on the date specified on the billing notice and must be paid in full within 15 days of the due date, except as otherwise provided in the grazing permit or lease. If payment is not made within that time frame, a late fee (greater of 25\$ or 10 percent of the amount owed but not more than \$250) Will be assessed.

The Pipeline Allotment was not included under these recommendations and should be further analyzed through an EA due to the presence of Peebles Navajo Cactus; the EA will look at mitigation measures and potential impact of cattle and OHV use in relation to the species.

8.0 List of Preparers

Amelia Taylor, Assistant Field Manager-Renewables
Brandon Schurch, Rangeland Management Specialist
Dodge DiVall, Natural Resource Specialist (Recreation)
Casey Bruner, Wildlife Biologist
George Maloof, Cultural Resource Specialist
Joneen Cockman, Natural Resource Specialist
Krissy Sherman, Natural Resource Specialist (Recreation)
Matthew Stewart, Hydrologist
Ryan Peterson, Rangeland Management Specialist
Sarah Sherman, Planning and Environmental Coordinator
Shelby Leachet, GIS Specialist

9. Authorized Officer Concurrence

I have reviewed the determinations presented in *Section 7 Determinations of Land Health Standards* and the grazing and other management actions identified in *Section 8 Recommended Management Actions*.

___ I concur with the conclusions and recommendations as written.

___ I do not concur.

___ I concur, but with the following modifications.

Scott C. Cooke

Date

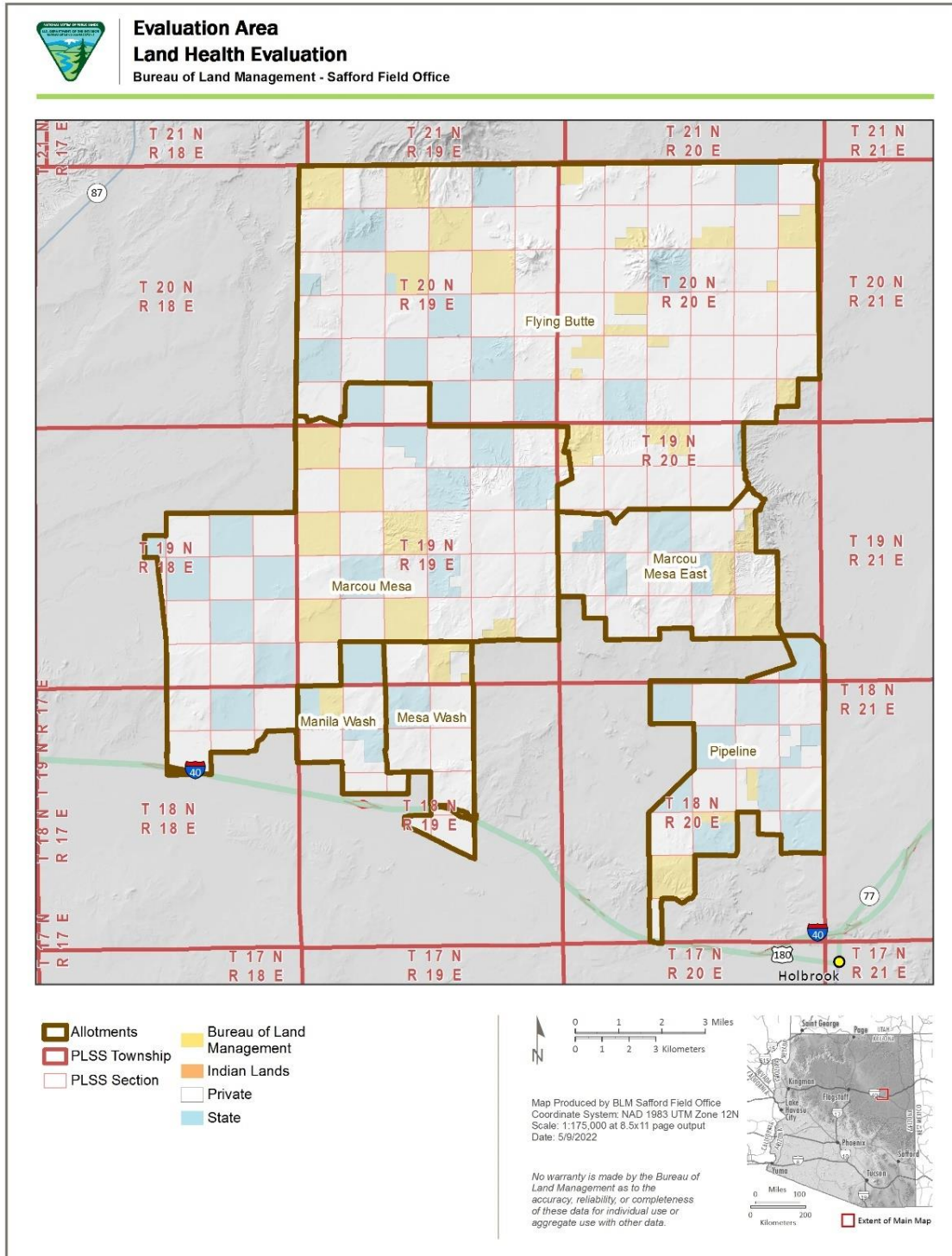
10. References

- Altman, B. and K. Woodruff. (2012). Conservation assessment for Gray Flycatcher (*Empidonax wrightii*). USDA Forest Service Region 6 and BLM, Oregon and Washington.
- Arizona Department of Water Resources (ADWR) Arizona Water Atlas Volume 1 Executive Summary, September 2010
- Braun, C. E., M. F. Baker, R. L. Eng, J. S. Gashwiler and M. H. Schroeder. (1976a). Conservation committee report on effects of alteration of sagebrush communities on the associated avifauna. *Wilson Bulletin* 88:165-171.
- Downes, S. (2006). Gray Flycatchers nesting in the shrub-steppe of eastern Kittitas County. *Wash. Birds* 9:71-73.
- Gaddis, P. K. (1987). Social interactions and habitat overlap between Plain and Bridled titmice. *Southwestern Naturalist* 32:197-20
- Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at the following link: <http://websoilsurvey.sc.egov.usda.gov/>. Accessed [12/30/2021].
- Marshall, J. T., Jr. (1957). Birds of pine-oak woodland in southern Arizona and adjacent Mexico. *Pacific Coast Avifauna* no. 32.
- Mexican Wolf Interagency Field Team (MWIFT). (2021). Mexican Wolf Recovery Program, Fourth Quarter, <https://azgfd-portal-wordpress-pantheon.s3.us-west-2.amazonaws.com/wp-content/uploads/archive/Q4-Wolf-Report-2021.pdf>
- Nolin and McKim. (2006). Frequency Modes of Monsoon Precipitation in Arizona and New Mexico.
- Page, L.M., and B.M. Burr. 2011. Peterson field guide to freshwater fishes of North America north of Mexico. 2nd edition. Houghton Mifflin Harcourt, Boston, MA
- Pellant, M., P.L. Shaver, D.A. Pyke, J.E. Herrick, N. Lepak, G. Riegel, E. Kachergis, B.A. Newingham, D. Toledo, and F.E. Busby. (2020). Interpreting Indicators of Rangeland Health, Version 5. Tech Ref 1734-6. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO
- Parameter-elevation Regressions on Independent Slopes Model (PRISM). (2017). PRISM Climate Group, Oregon State University, <http://prism.oregonstate.edu>, created 14 October 2021.
- Timm, R.; Álvarez-Castañeda, S.T.; Frey, J.; Lacher, T. (2019). "*Dipodomys spectabilis*". *IUCN Red List of Threatened Species*.

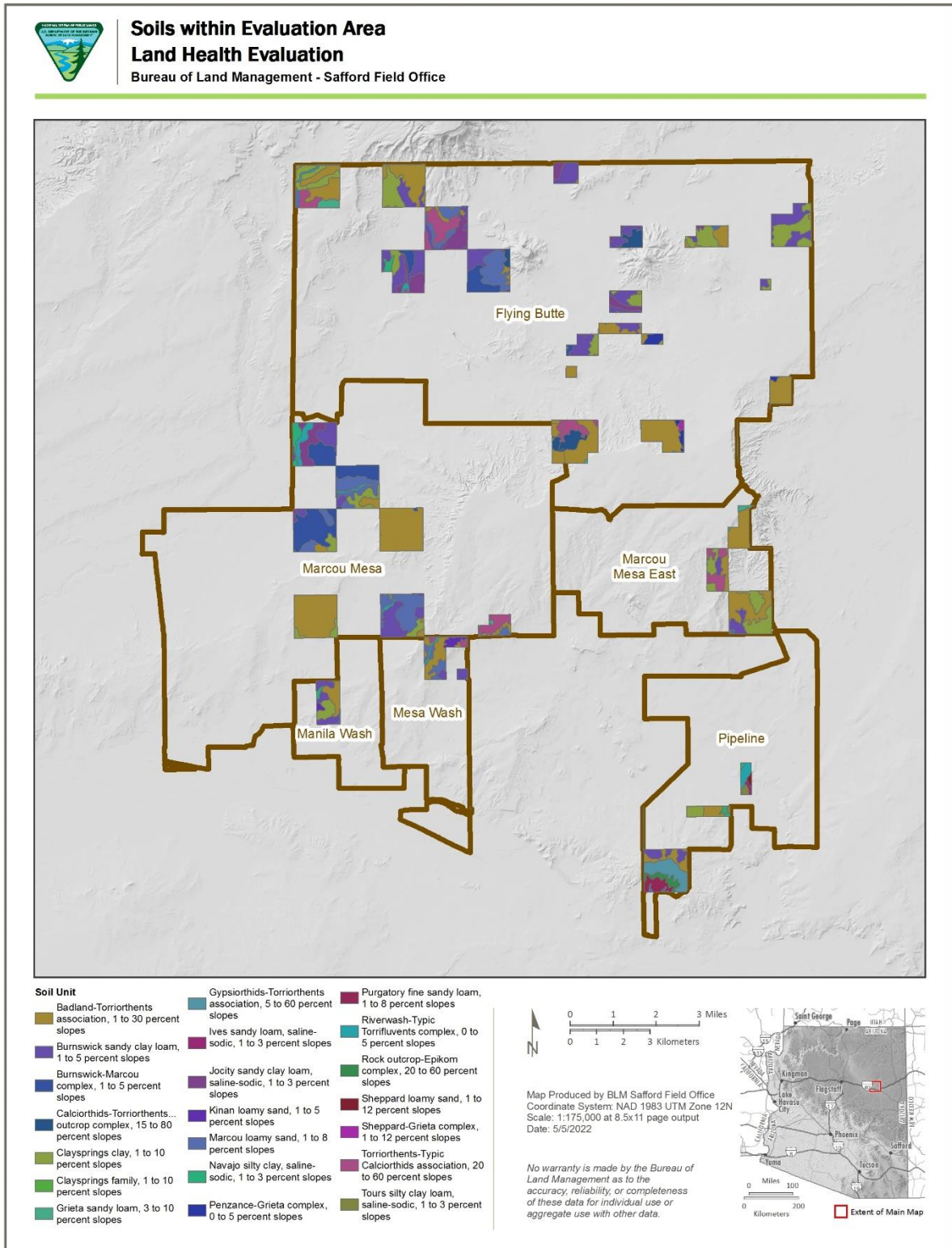
- U.S. Department of the Interior, Bureau of Land Management (USDI BLM). (1997). Arizona standards for rangeland health and guidelines for grazing administration. Phoenix, AZ. 164 pp.
- U.S. Department of the Interior, Bureau of Land Management (USDI BLM). (1987). Eastern Arizona Grazing Environmental Impact Statement Final.
- U.S. Department of the Interior, Bureau of Land Management (USDI BLM). (N.d.). Rangeland Administration System. Available at <https://www.blm.gov/ras/>. Accessed 05/09/2022.
- U.S. Department of the Interior, Bureau of Land Management (USDI BLM). (1989). Phoenix Resource Management Plan and Environmental Impact Statement.
- U.S. Fish and Wildlife Service (USFWS). (1984b). Peebles Navajo Cactus (*Pediocactus peeblesianus* (Croizat) L. Benson var. *peeblesianus*) Recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 58 pp.
- U.S. Fish and Wildlife Service (USFWS). (2012). Biological Opinion on the Gila District Livestock Grazing Program. Ecological Services, Phoenix, Arizona.
- U.S. Fish and Wildlife Service (USFWS). (2020a). Endangered and Threatened Wildlife and Plants; 12-month finding for the monarch butterfly, Federal Register 85:2020–27523. December 17, 2020

Appendix A: Maps

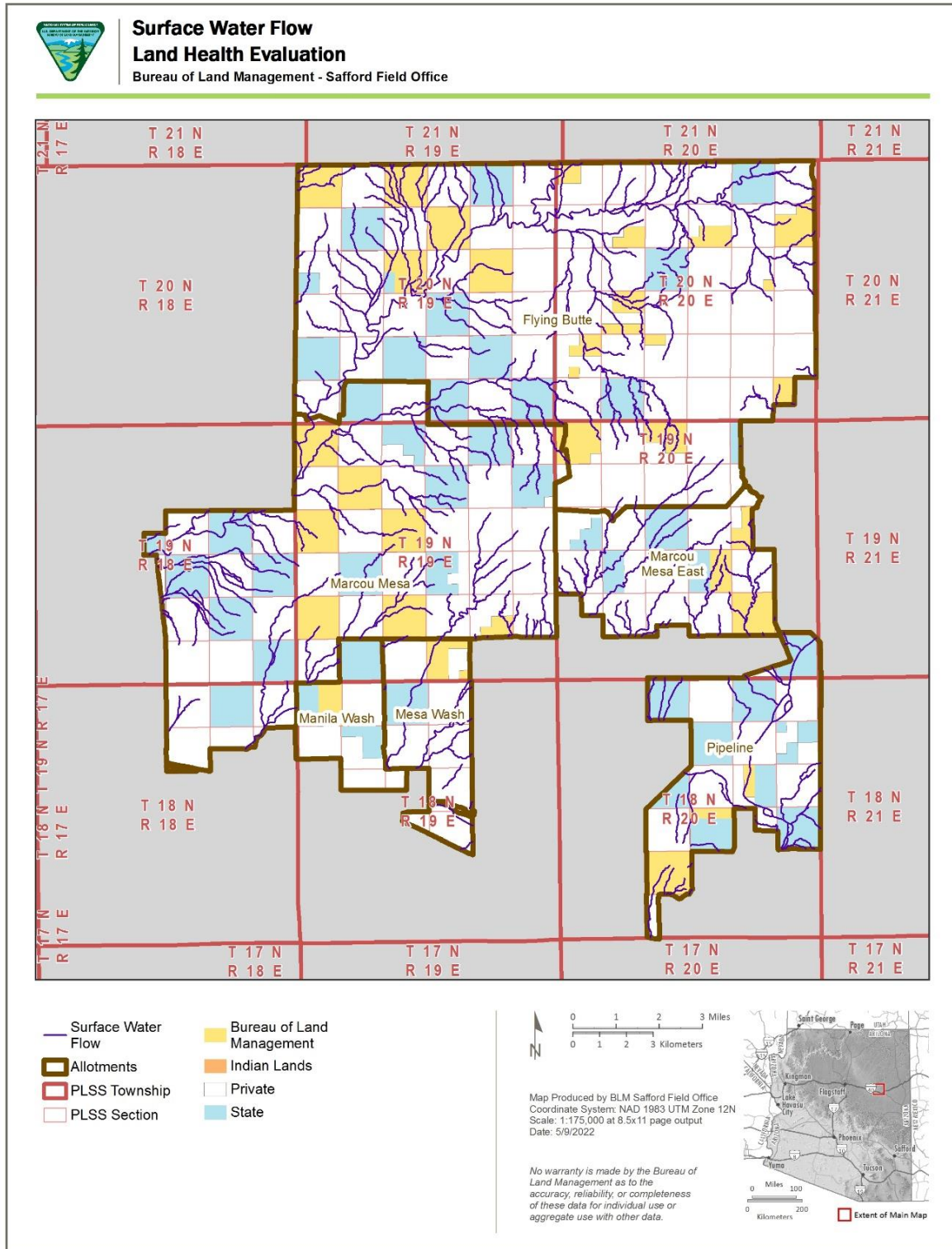
Appendix A. 1: Evaluation Area Map



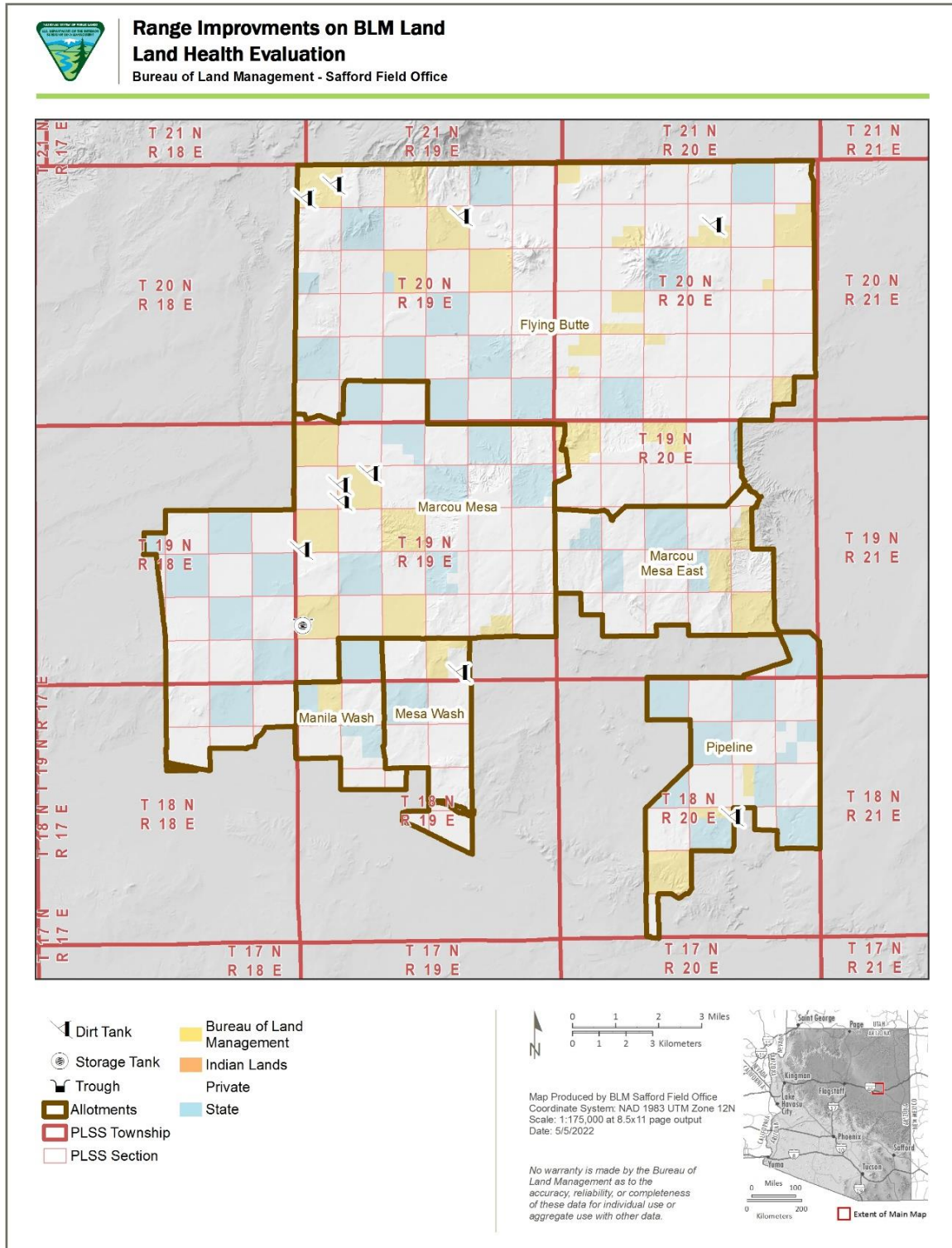
Appendix A. 2: Soils within Evaluation Area



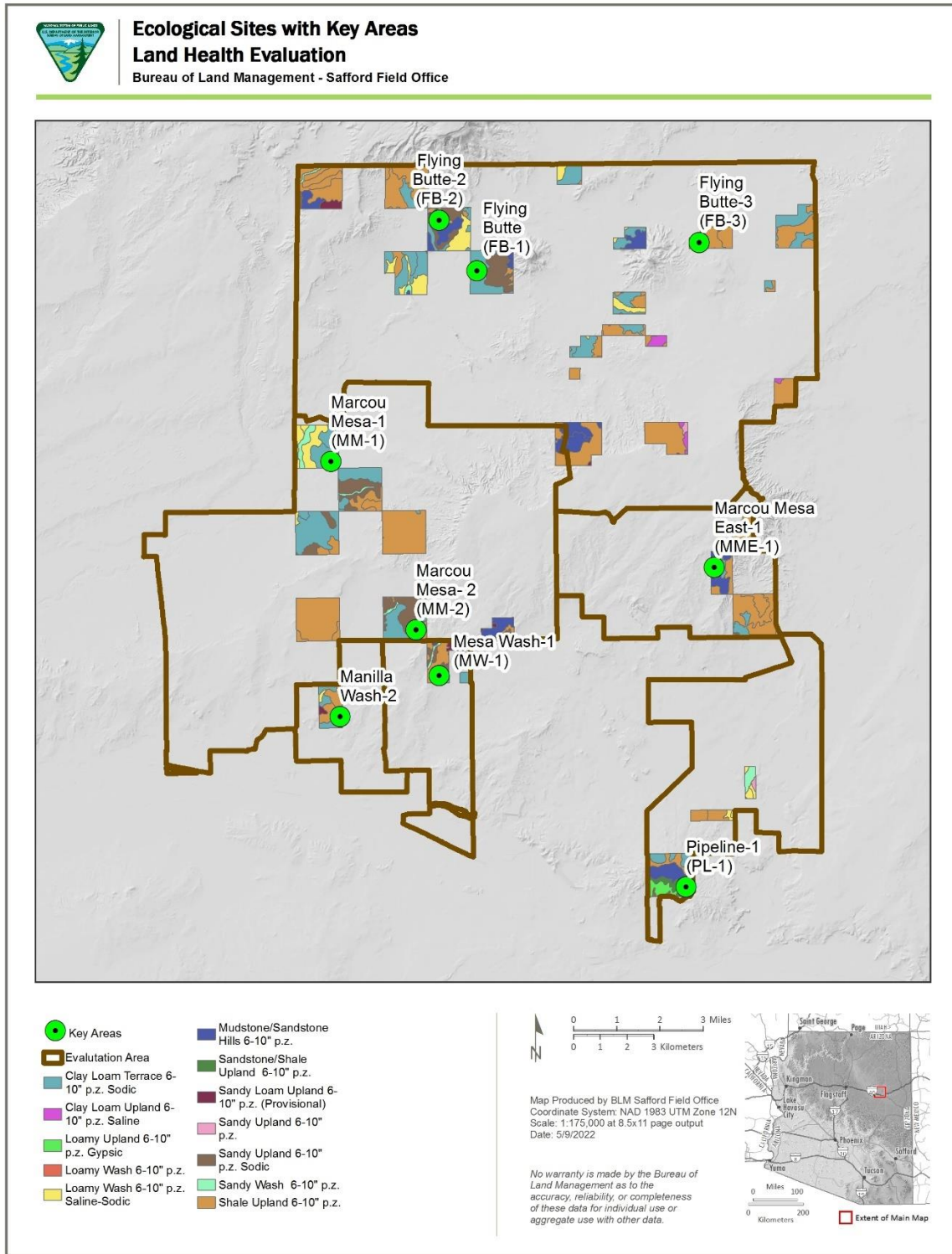
Appendix A. 3 Surface Water Flow Lines



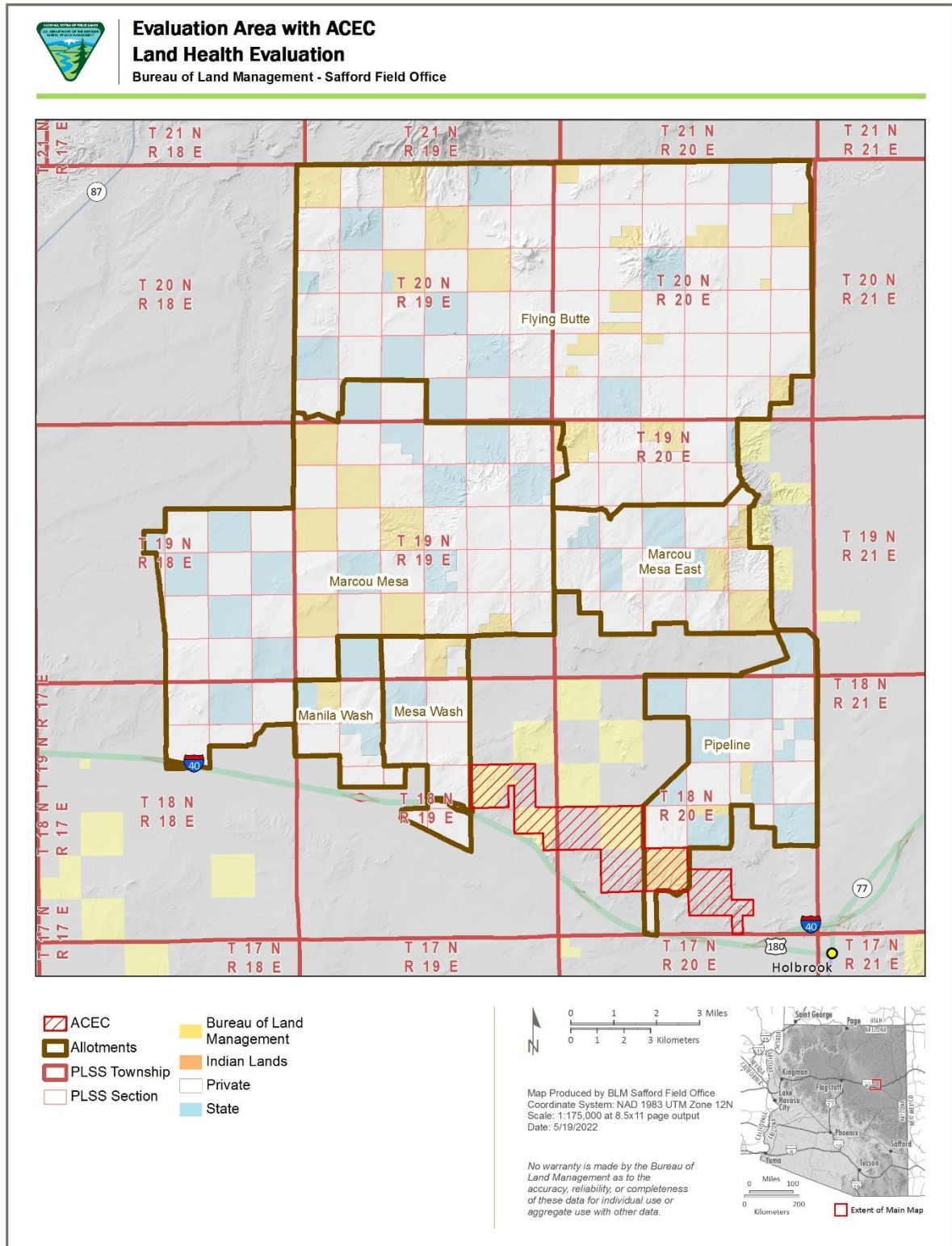
Appendix A. 4 Range Improvements on BLM Land



Appendix A. 5: Ecological Sites with Key Areas

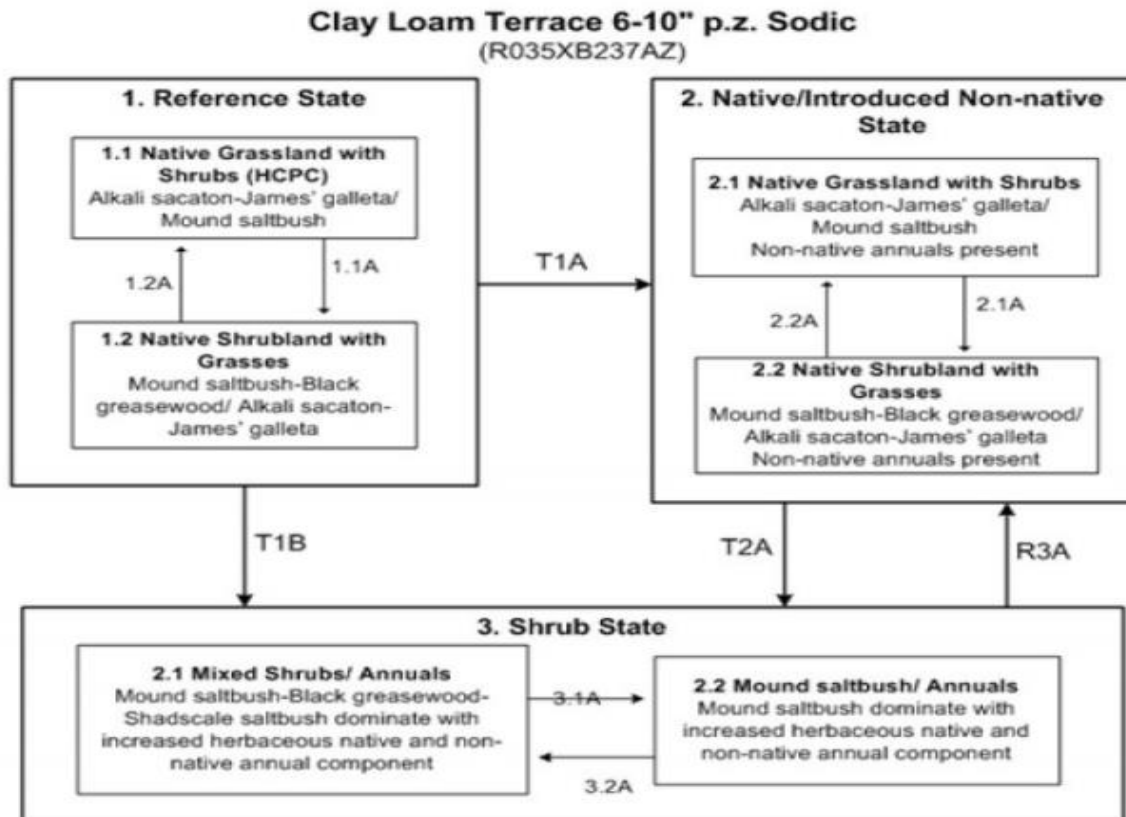


Appendix A. 6: Evaluation Area with ACEC



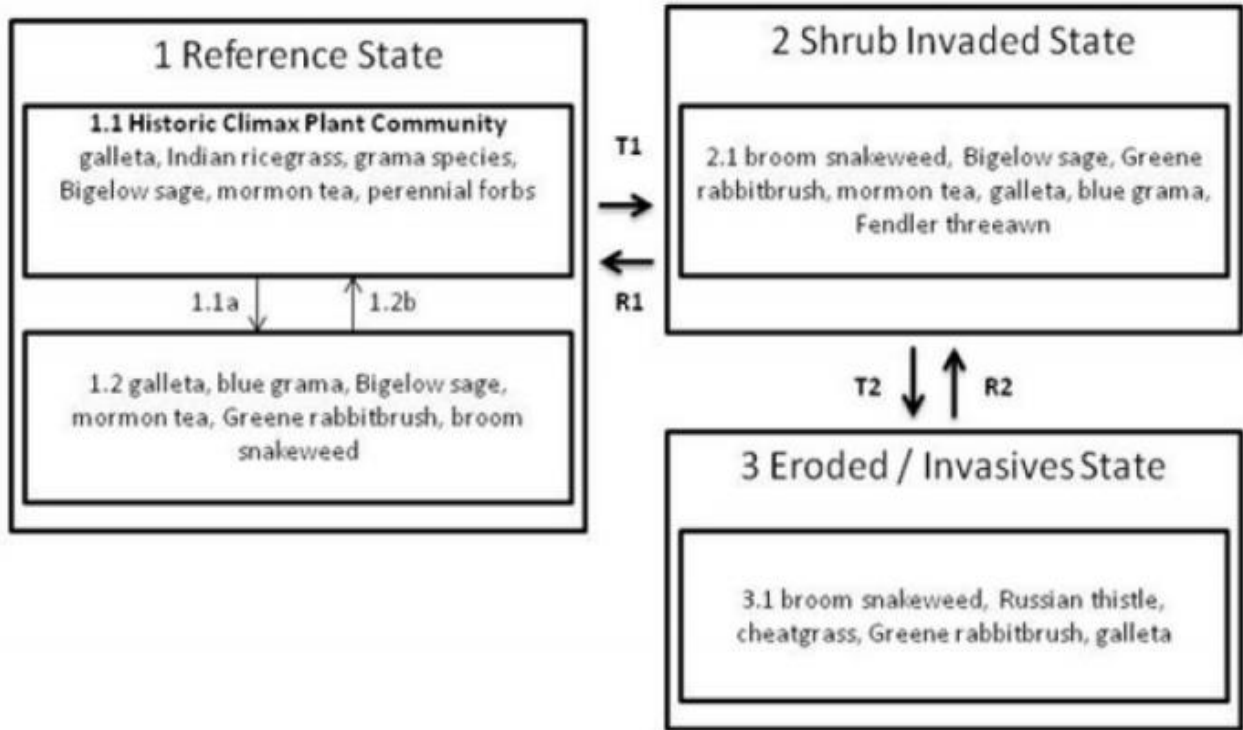
Appendix B: State and Transition Models

Appendix B. 1: Ecological Site R035XB237AZ



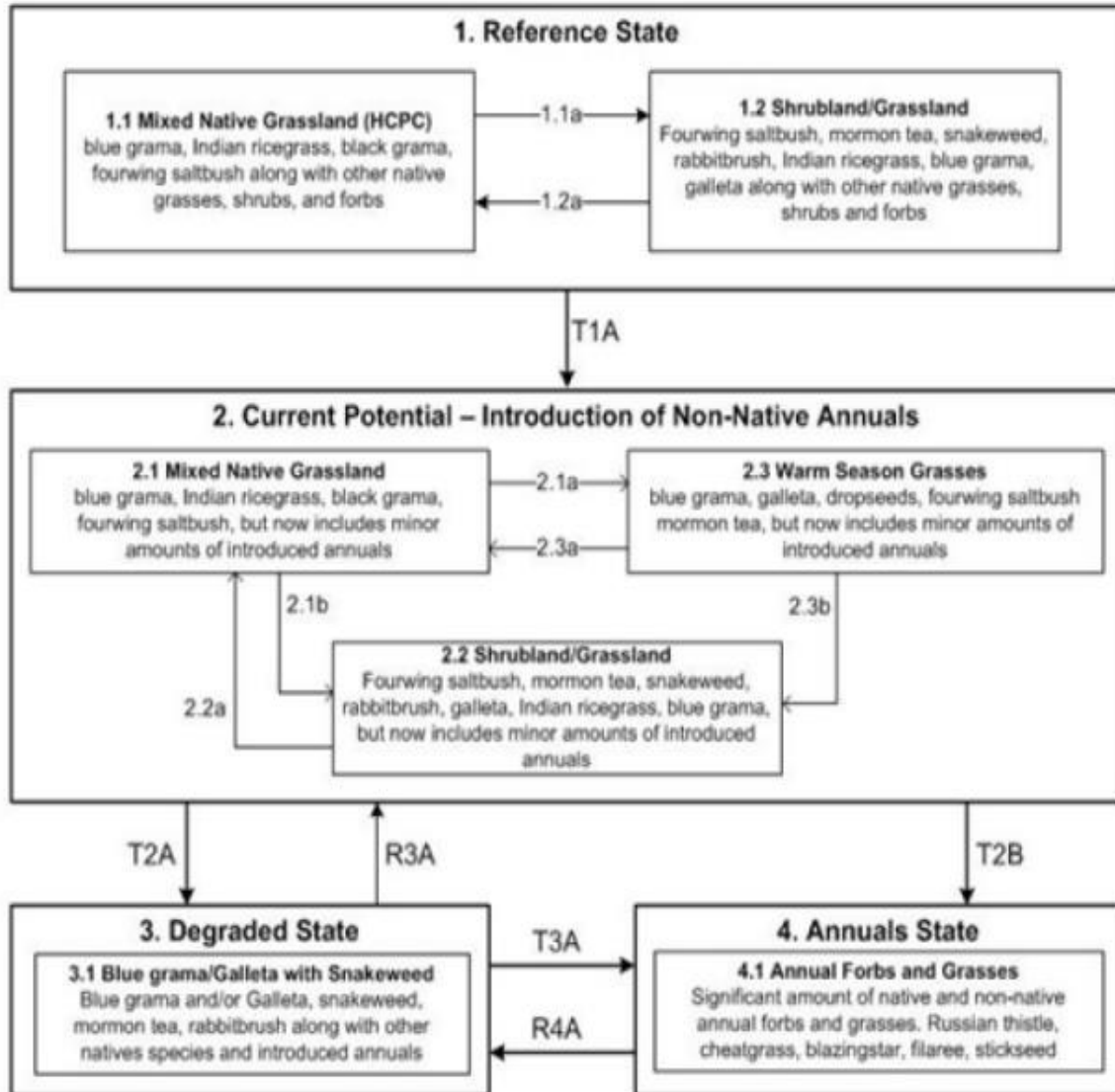
Appendix B. 2: Ecological Site R035XB201AZ

35.2 Mudstone Sandstone Hills 6-10" p.z.



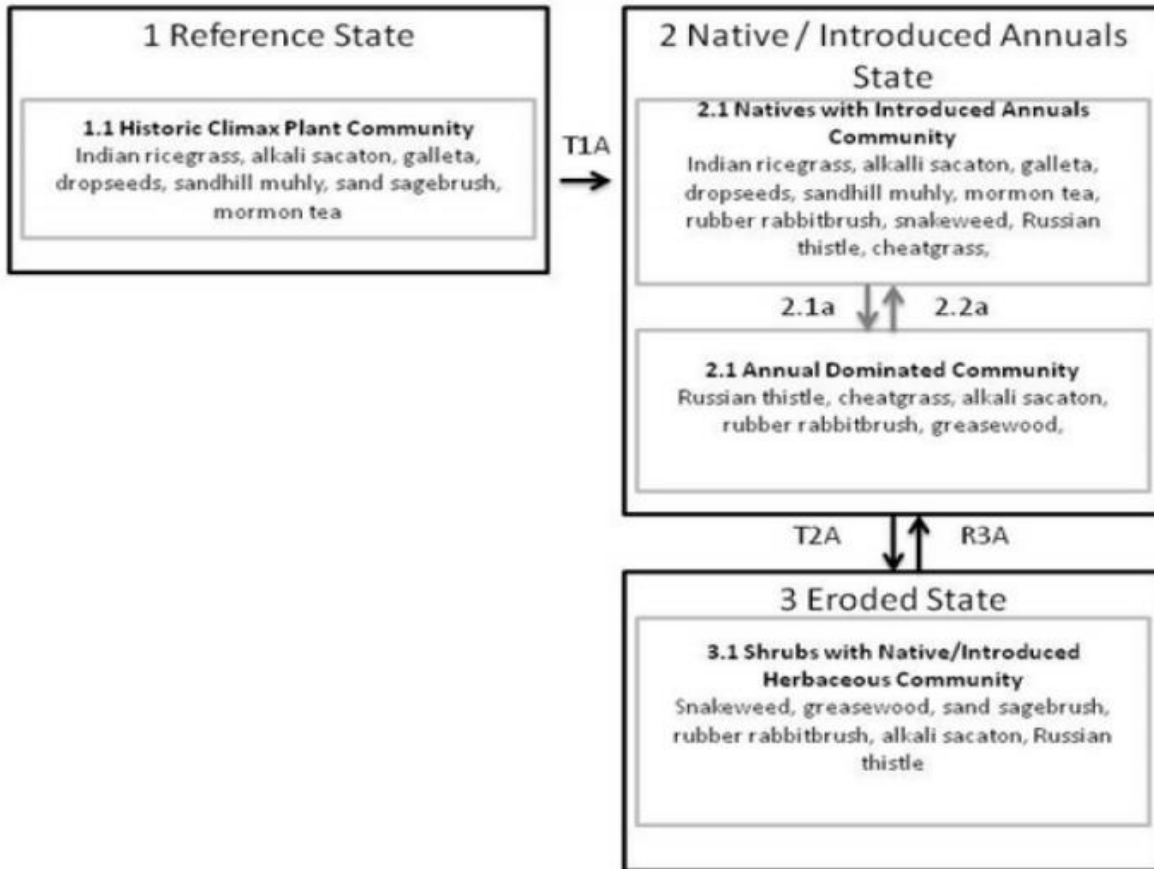
Appendix B. 3: Ecological Site R035XB219AZ

35.2AZ Sandy Loam Upland 6-10" p.z. (R035XB219AZ)



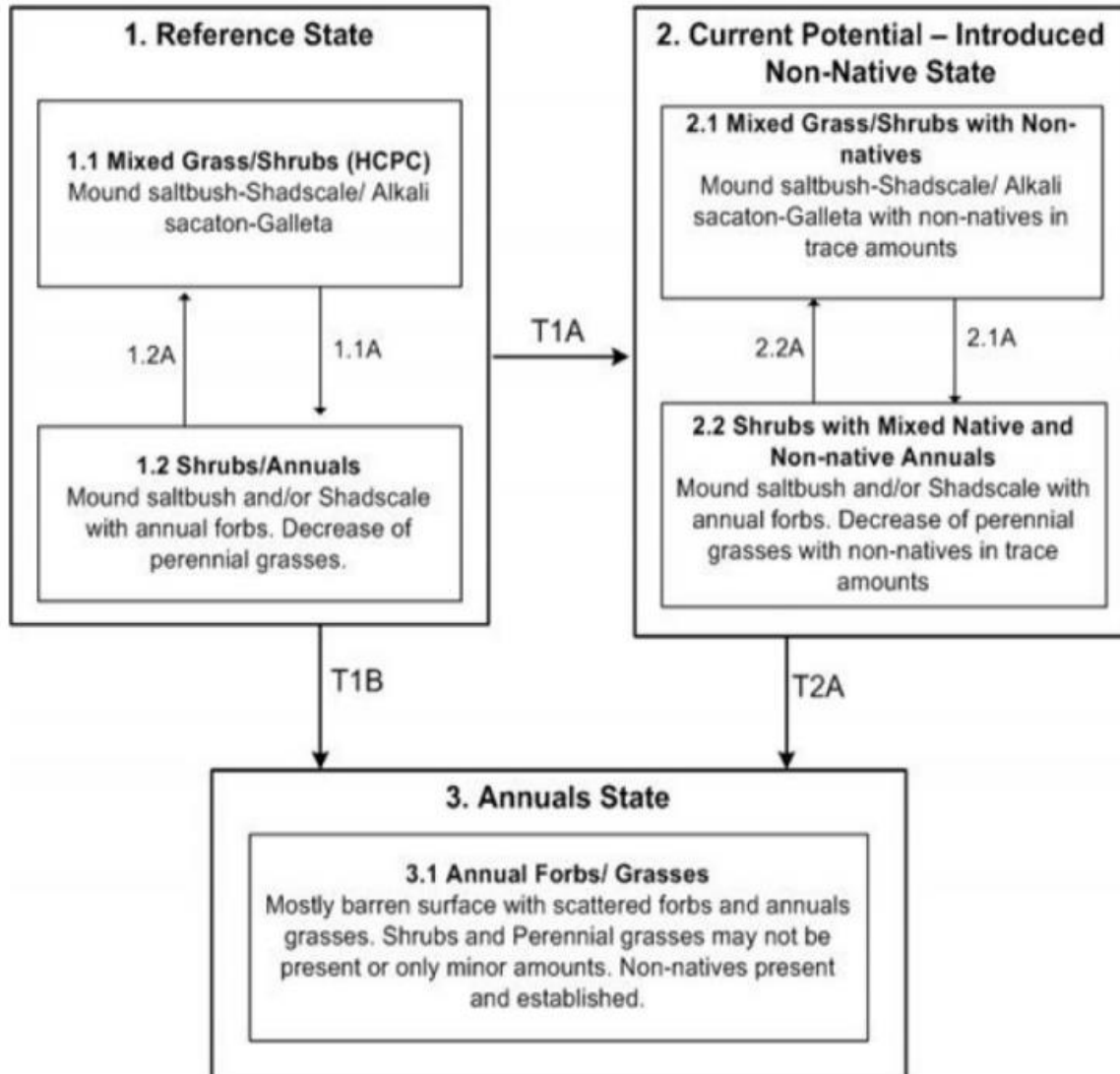
Appendix B. 4: Ecological Site R035XB223AZ

35.2 Sandy Upland 6-10" p.z. Sodic



Appendix B. 5: Ecological Site R035XB220AZ

**35.2AZ Shale Upland 6-10" p.z.
(R035XB220AZ)**



Appendix C: DPC Objectives and Methodology for Associated Ecological Sites

Appendix C. 1: Ecological Site R035XB237AZ, Clay Loam Terrace 6-10" p.z. Sodic, DPC Objectives and Methodology

URL: <https://edit.jornada.nmsu.edu/catalogs/esd/035X/R035XB237AZ>

Bare ground/ Litter Cover:

The DPC objectives for bare ground and litter cover were provided from the ESD reference sheet. Bare ground was presented in indicator four and litter cover was presented in Table 6. Ground cover of the reference sheet (presented below).

- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ranges 35-55% and has the potential to produce a heavy amount of plant cover and litter due to an average available water capacity of 10.7 inches. Drought may cause increase in bare ground.

Litter cover is presented in Table 6. Ground cover of the ESD reference sheet and is as follows:

- 15-30%

Canopy Cover/Basal Cover

These indicators were provided in indicator ten of the ESD reference sheet (pictured below).

- 10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** This site is characterized by a relatively even distribution of grasses with scattered shrubs. There may be small patches or a light overstory of large shrubs. Vegetative canopy cover ranges from 15-35% (grasses > shrubs > forbs). Basal cover ranges 5-12% (predominantly grasses) for vascular plants and 0-1% for biological crust (moss > lichen > cyanobacteria). Both canopy and basal cover values decrease during a prolonged

Desired Plant Community Composition:

The table below presents the process used for establishing Desired Plant Community Composition for the Clay Loam Terrace 6-10" p.z. Sodic ecological site. The species composition was established using the annual production range by plant type as provided in table 11 of the ESD reference sheet. Table 11 provides the low and high annual production values for all vegetation types. For each vegetation type the low and high annual production values were added up. These sums were then divided by the total low and the total high annual production values for all vegetation types, this resulted in a percent composition for that vegetation type providing an appropriate range for the desired plant community composition.

Desired Plant Community Composition Methodology

For

Clay Loam Terrace 6-10" p.z. Sodic (R035XB237AZ)

Total Annual Production for All Vegetation

(* Note this is the sum of all values as provided in Table 11 of the ESD Reference Sheet)

350 – 775 lbs. per acre

Vegetation Type	Low Production Values	High Production Values
Grass/Grasslike	$235/350 * 100 = 67\%$	$430/775 * 100 = 55\%$
Forb	$0/350 * 100 = 0\%$	$85/775 * 100 = 11\%$
Shrub/Vine	$115/350 * 100 = 33\%$	$260/775 * 100 = 34\%$

Desired Plant Community Composition Objectives for Clay Loam Terrace 6-10" p.z. (R035XB237AZ)

Methodology: The DPC objectives were established using the percentages calculated above and are summarized below.

Vegetation Type	Range of Acceptable Composition
Grasses	55-67%
Forb	0-11%
Shrub	33-34%

Appendix C. 2: Ecological Site R035XB201AZ DPC, Mud/Sandstone Hills 6-10”p.z., DPC Objectives and Methodology

URL: <https://edit.jornada.nmsu.edu/catalogs/esd/035X/R035XB201AZ>

Bare ground/ Litter Cover:

The DPC objectives for bare ground and litter cover were provided from the ESD reference sheet. Bare ground was presented in indicator four and litter cover was presented in indicator fourteen of the reference sheet (presented below).

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): 20 to 40% bare ground depending on rock and gravel cover. Bare areas are moderate in size, but are rarely connected.

14. Average percent litter cover (%) and depth (in): Within plant interspaces litter ranges from 0 to 10 % cover with no real depth, while under some shrub canopies it ranges from 20 to 40% cover with depths from 1/8 to 1/2 inches thick. Litter amounts increase during the first few years of drought, then decrease in later years.

Canopy Cover/Basal Cover

The ESD reference sheet does not provide a range for acceptable canopy cover, indicator 10 of the reference sheet however provides the following description:

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: This site is characterized by a relatively even distribution of mostly perennial grasses and low shrubs across the landscape. Canopy and basal cover are dominated by warm season grasses and evergreen shrubs. Both plant cover values (especially basal) decrease during a prolonged summer drought. This type of plant community along with surface rock cover and slopes are somewhat effective at capturing and storing precipitation.

Desired Plant Community Composition:

The table below presents the process used for establishing Desired Plant Community Composition for the Mudstone/Sandstone Hills 6-10” p.z. ecological site. The species composition was established using the annual production range by plant type as provided in table 7 of the ESD reference sheet. Table 7 provides the low and high annual production values for all vegetation types. For each vegetation type the low and high annual production values were added up. These sums were then divided by the total low and the total high annual production values for all vegetation types, this resulted in a percent composition for that vegetation type providing an appropriate range for the desired plant community composition.

Desired Plant Community Composition Methodology
For
Mudstone/Sandstone Hills 6-10" p.z. (R035XB201AZ)

Total Annual Production for All Vegetation

(Note this is the sum of all values as provided in Table 6 of the ESD Reference Sheet)*

225 – 651 lbs. per acre

Vegetation Type	Low Production Values	High Production Values
Grass/Grasslike	$145/225 * 100 = 64\%$	$325/651 * 100 = 50\%$
Forb	$0/225 * 100 = 0\%$	$56/651 * 100 = 9\%$
Shrub/Vine	$80/225 * 100 = 36\%$	$270/651 * 100 = 41\%$

**Desired Plant Community Composition Objectives for Mudstone/Sandstone Hills 6-10" p.z.
(R035XB201AZ)**

Methodology: The DPC objectives were established using the percentages calculated above and are summarized below.

Vegetation Type	Range of Acceptable Composition
Grasses	50-64%
Forb	0-9%
Shrub	36-41%

Appendix C. 3: Ecological Site R035XB220AZ, Shale Upland 6-10" p.z., DPC Objectives and Methodology

URL: <https://edit.jornada.nmsu.edu/catalogs/esd/035X/R035XB220AZ>

Bare ground/ Litter Cover:

The DPC objectives for bare ground and litter cover were provided from the ESD reference sheet. Bare ground was presented in indicator four and litter cover was presented in indicator fourteen of the reference sheet (presented below).

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): Expected bare ground range 25-50 depending on surface fragments. Well developed, intact biological crust should not be counted as bare ground.

14. Average percent litter cover (%) and depth (in): Herbaceous litter is not persistent on the site.

Canopy Cover/Basal Cover

The ESD reference sheet does not provide a range for acceptable canopy cover, indicator 10 of the reference sheet however provides the following description:

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: This site is characterized by a relatively even distribution of perennial grasses with scattered half-shrubs and is well distributed across the site and lends to slowing runoff and allowing for moderate infiltration.

Desired Plant Community Composition:

The table below presents the process used for establishing Desired Plant Community Composition for the Shale Upland 6-10" p.z. ecological site. The species composition was established using the annual production range by plant type as provided in table 6 of the ESD reference sheet. Table 6 provides the low and high annual production values for all vegetation types. For each vegetation type the low and high annual production values were added up. These sums were then divided by the total low and the total high annual production values for all vegetation types, this resulted in a percent composition for that vegetation type providing an appropriate range for the desired plant community composition.

Desired Plant Community Composition Methodology

For

Shale Upland 6-10" p.z. (R035XB220AZ)

Total Annual Production for All Vegetation

(* Note this is the sum of all values as provided in Table 6 of the ESD Reference Sheet)

85 – 199 lbs. per acre

Vegetation Type	Low Production Values	High Production Values
Grass/Grasslike	$61/85 * 100 = 72\%$	$130/199 * 100 = 65\%$
Forb	$8/85 * 100 = 9\%$	$23/199 * 100 = 12\%$
Shrub/Vine	$16/85 * 100 = 19\%$	$46/199 * 100 = 23\%$

Desired Plant Community Composition Objectives for Loamy Shale Upland 6-10" p.z. (R035XB220AZ)

Methodology: The DPC objectives were established using the percentages calculated above and are summarized below.

Vegetation Type	Range of Acceptable Composition
Grasses	65-72%
Forb	9-12%
Shrub	19-23%

Appendix C. 4: Ecological Site R035XB223AZ, Sandy Upland 6-10” p.z. Sodic, DPC Objectives and Methodology

URL: <https://edit.jornada.nmsu.edu/catalogs/esd/035X/R035XB223AZ>

Bare ground/ Litter Cover:

The DPC objectives for bare ground and litter cover were provided from the ESD reference sheet. Bare ground was presented in indicator four and litter cover was presented in indicator fourteen of the reference sheet (presented below).

- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): 50-75%**

Litter Cover is not specified in the ESD reference sheet.

Canopy Cover/Basal Cover

The ESD reference sheet does not provide a range for acceptable canopy cover, indicator 10 of the reference sheet however provides the following description:\

- 10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Shrubs are scattered throughout the site, but tend to be clumped together. Herbaceous vegetation generally uniformly occurs within the interspaces. In wind-scoured areas devoid of surface sand there is generally no vegetation as this is where the sodium layer may be exposed.

Desired Plant Community Composition:

The table below presents the process used for establishing Desired Plant Community Composition for the Sandy Upland 6-10” p.z. Sodic ecological site. The species composition was established using the annual production range by plant type as provided in table 7 of the ESD reference sheet. Table 7 provides the low and high annual production values for all vegetation types. For each vegetation type the low and high annual production values were added up. These sums were then divided by the total low and the total high annual production values for all vegetation types, this resulted in a percent composition for that vegetation type providing an appropriate range for the desired plant community composition.

Desired Plant Community Composition Methodology

For

Sandy Upland 6-10" p.z. Sodic (R035XB223AZ)

Total Annual Production for All Vegetation

(Note this is the sum of all values as provided in Table 6 of the ESD Reference Sheet)*

165 – 715 lbs. per acre

Vegetation Type	Low Production Values	High Production Values
Grass/Grasslike	$150/165 * 100 = 91\%$	$575/715 * 100 = 80\%$
Forb	$10/165 * 100 = 6\%$	$35/715 * 100 = 5\%$
Shrub/Vine	$5/165 * 100 = 3\%$	$105/715 * 100 = 15\%$

Desired Plant Community Composition Objectives for Loamy Shale Upland 6-10" p.z. (R035XB220AZ)

Methodology: The DPC objectives were established using the percentages calculated above and are summarized below.

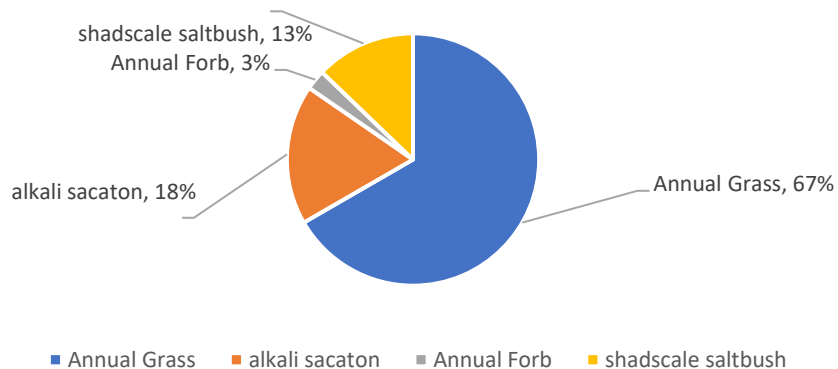
Vegetation Type	Range of Acceptable Composition
Grasses	80-91%
Forb	5-6%
Shrub	3-15%

Appendix D: LPI Monitoring Data for Key Areas Compared to DPC Objectives

Appendix D. 1: Key Area FB-1 LPI/DPC Objectives

DPC Objectives for Plant Community Composition	Species Composition FB-1	
Grasses 55-67% Composition	Annual Grass- 66% alkali sacaton (SPAI) - 18%	
	Total –84%	
Forbs 0-11% Composition	Annual Forb- 3%	
	Total –3%	
Shrubs 33-44% Composition	shadscale saltbush (ATCO) -13%	
	Total –13%	
FB-1: Clay Loam Terrace 6-10” p.z. Sodic (R035XB237AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	55-67%	84%
Composition of Forbs	0-11%	3%
Composition of Shrubs	33-44%	13%
Bare Ground	35-55%	20%
Canopy Cover	15-35%	70%
Basal Cover	5-12%	12%
Litter Cover	15-30%	26%

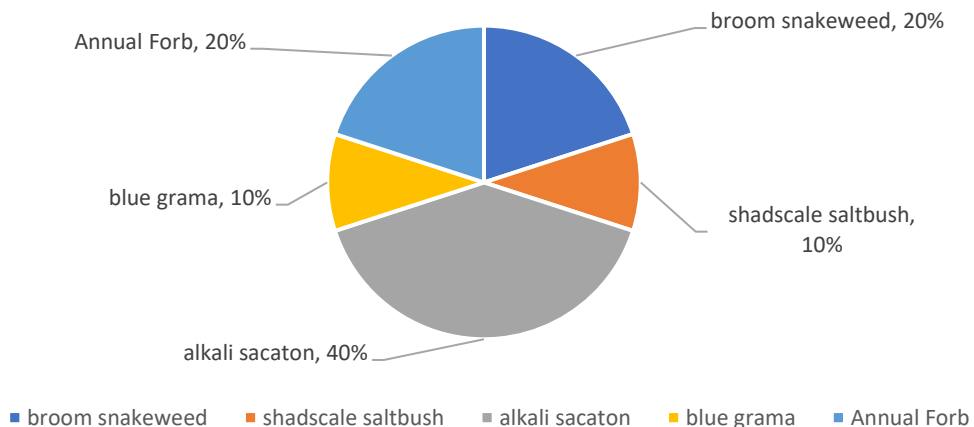
Species Composition Based on LPI at FB-1



Appendix D. 2: Key Area FB-2 LPI/DPC Objectives

DPC Objectives for Plant Community Composition	Species Composition FB-2	
Grasses 50-64% Composition	blue grama (BOGR2) - 10% alkali sacaton (SPAI) - 40%	
	Total –50%	
Forbs 0-9% Composition	Annual Forb - 20%	
	Total –20%	
Shrubs 36-41% Composition	shadscale saltbush (ATCO) -10% broom snakeweed (GUSA2) - 20%	
	Total - 30%	
FB-2: Mudstone/Sandstone Hills 6-10” p.z. (R035XB201AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	50-64%	50%
Composition of Forbs	0-9%	20%
Composition of Shrubs	36-41%	30%
Bare Ground	20-40%	20%
Canopy Cover	10-31%	20%
Basal Cover	4-10%	2%
Litter Cover	0-40%	32%

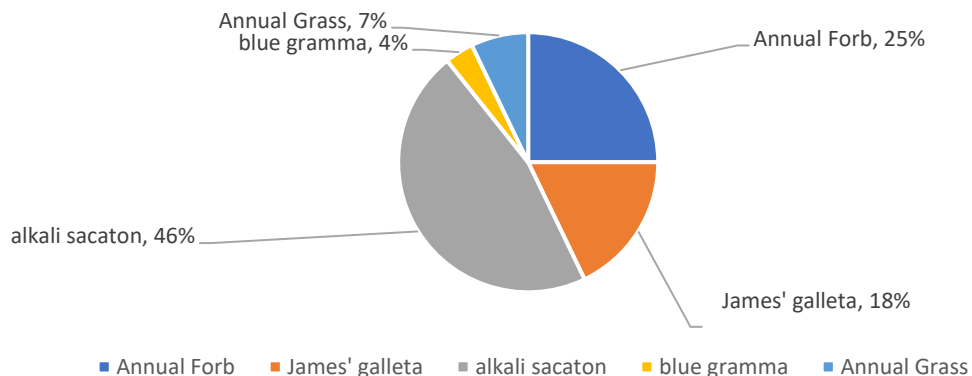
Species Composition Based on LPI at FB-2



Appendix D. 3: Key Area FB-3 LPI/DPC Objectives

DPC Objectives for Plant Community Composition	Species Composition FB-3	
Grasses 65-72% Composition	alkali sacaton (SPAI) - 43% James’ galleta (PLJA) - 21% blue grama (BOGR2) - 4% Annual Grass - 7	
	Total - 75%	
Forbs 9-12% Composition	Annual Forb - 25%	
	Total –25%	
Shrubs 19-23% Composition	N/A	
	Total - 0%	
FB-3: Shale Upland 6-10” p.z. (R035XB220AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	65-72%	75%
Composition of Forbs	9-12%	25%
Composition of Shrubs	19-23%	0%
Bare Ground	25-50%	34%
Canopy Cover	5-12%	52%
Basal Cover	>2%	6%
Litter Cover	0%	24%

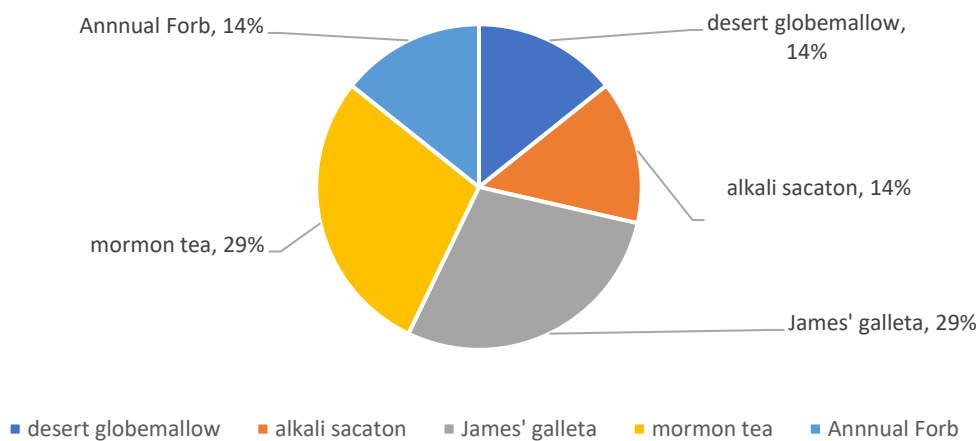
Species Composition Based on LPI at FB-3



Appendix D. 4: Key Area MW-2 LPI/DPC Objectives

DPC Objectives for Plant Community Composition	Species Composition MW-2	
Grasses 65-72% Composition	alkali sacaton (SPAI) - 14% James’ galleta (PLJA) - 29%	
	Total - %	
Forbs 9-12% Composition	Annual Forb - 14%	
	Total –25%	
Shrubs 19-23% Composition	dessert globemallow (SPAM2) – 14% mormon tea (EPVI) – 29%	
	Total - 43%	
MW-2: Shale Upland 6-10” p.z. (R035XB220AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	65-72%	43%
Composition of Forbs	9-12%	14%
Composition of Shrubs	19-23%	43%
Bare Ground	25-50%	62%
Canopy Cover	5-12%	14%
Basal Cover	>2%	6%
Litter Cover	0%	24%

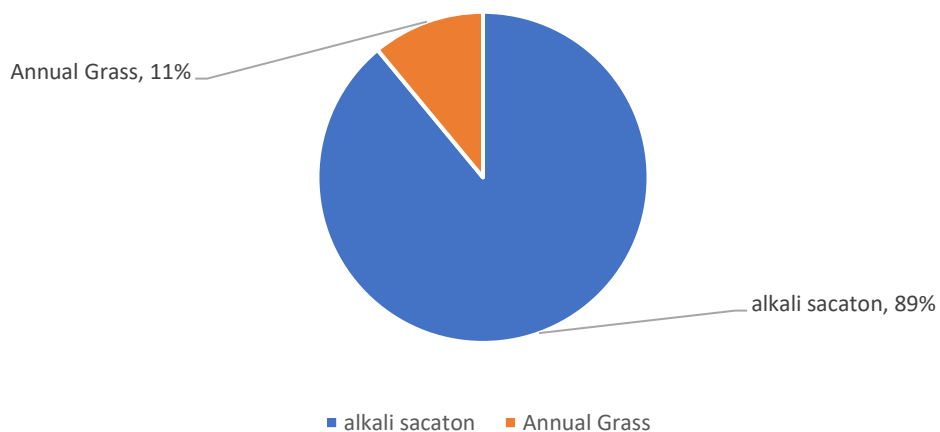
Species Composition Based on LPI at MW-2



Appendix D. 5: Key Area MM-1 LPI/DPC Objectives

DPC Objectives for Plant Community Composition	Species Composition MM-1	
Grasses 55-67% Composition	alkali sacaton (SPAI) - 89% Annual Grass - 11%	
	Total - %	
Forbs 0-11% Composition	N/A	
	Total –0%	
Shrubs 33-34% Composition	N/A	
	Total – 0%	
MM-1: Clay Loam Terrace 6-10” p.z. (R035XB237AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	55-67%	100%
Composition of Forbs	0-11%	0%
Composition of Shrubs	33-34%	0%
Bare Ground	35-55%	62%
Canopy Cover	15-35%	20%
Basal Cover	5-12%	6%
Litter Cover	15-30%	24%

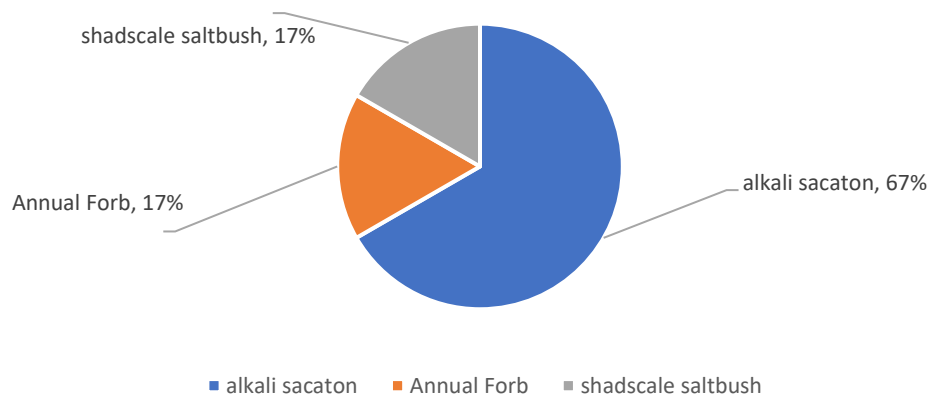
Species Composition Based on LPI at MM-1



Appendix D. 6: Key Area MM-2 DPC/LPI Objectives

DPC Objectives for Plant Community Composition	Species Composition MM-2	
Grasses 80-91% Composition	alkali sacaton (SPA1) - 67%	
	Total - 67 %	
Forbs 5-6% Composition	Annual Forb -17%	
	Total –17%	
Shrubs 3-15% Composition	shadscale saltbush (ATCO) – 17%	
	Total – 17%	
MM-2: Sandy Upland 6-10” p.z. (R035XB223AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	80-91%	67%
Composition of Forbs	5-6%	17%
Composition of Shrubs	3-15%	17%
Bare Ground	50-75%	78%
Canopy Cover	17-39	12%
Basal Cover	6-13%	4%
Litter Cover	5-15%	16%

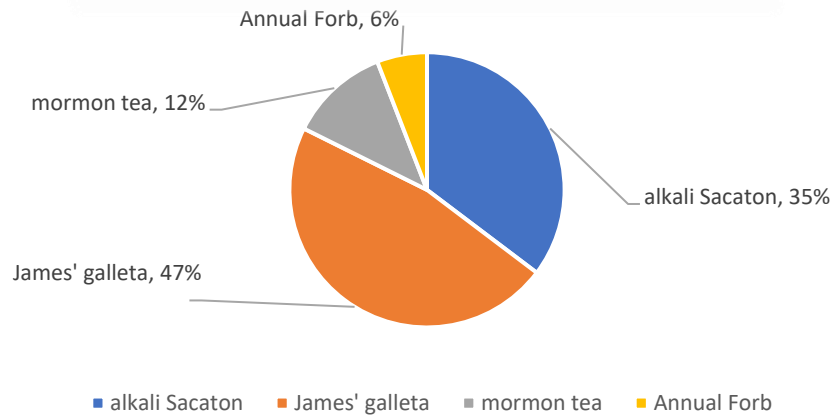
Species Composition Based on LPI at MM-2



Appendix D. 7: Key Area MME-1 LPI/DPC Objectives

DPC Objectives for Plant Community Composition	Species Composition MME-1	
Grasses 65-72% Composition	alkali sacaton (SPAI) - 35% James’ galleta (PLJA) - 47%	
	Total - 82%	
Forbs 9-12% Composition	Annual Forb – 6%	
	Total – 6%	
Shrubs 19-23% Composition	mormon tea – 12%	
	Total – 12%	
MME-1: Shale Upland 6-10” p.z. (R035XB220AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	65-72%	82%
Composition of Forbs	9-12%	6%
Composition of Shrubs	19-23%	12%
Bare Ground	25-50%	38%
Canopy Cover	5-12%	32%
Basal Cover	>2%	10%
Litter Cover	0%	26%

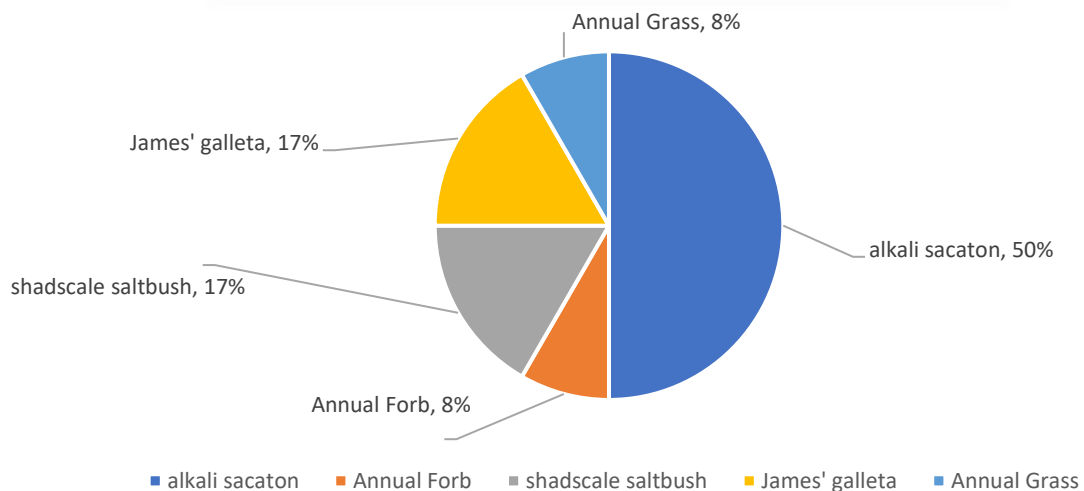
Species Composition Based on LPI at MME-1



Appendix D. 8: Key Area Mesa Wash-1 LPI/DPC Objectives

DPC Objectives for Plant Community Composition	Species Composition Mesa Wash-1	
Grasses 80-91% Composition	alkali sacaton (SPAI) - 50% James’ galleta (PLJA) - 17% Annual Grass - 8	
	Total - 75%	
Forbs 5-6% Composition	Annual Forb – 8%	
	Total – 8%	
Shrubs 3-15% Composition	shadscale saltbush – 17%	
	Total – 17%	
Mesa Wash-1: Sandy Upland 6-10” p.z. (R035XB223AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	80-91%	75%
Composition of Forbs	5-6%	8%
Composition of Shrubs	3-15%	17%
Bare Ground	50-75%	64%
Canopy Cover	17-39%	22%
Basal Cover	6-13%	8%
Litter Cover	5-15%	16%

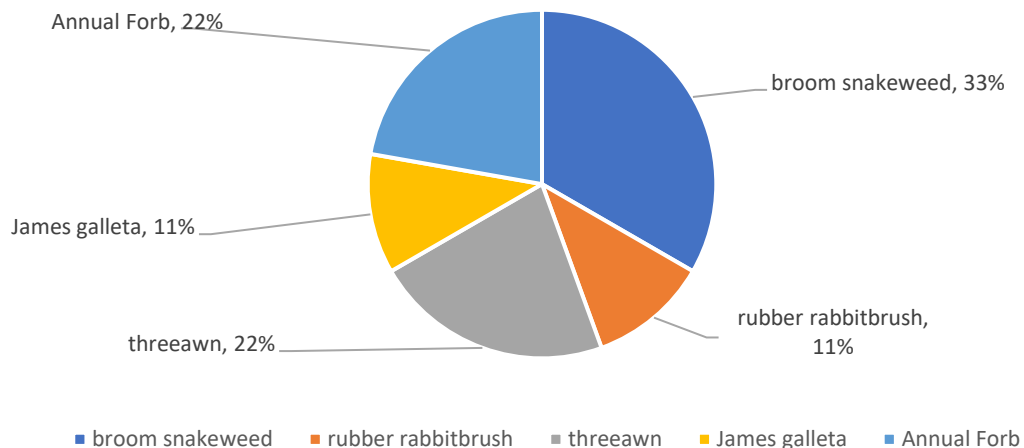
Species Composition Based on LPI at Mesa Wash-1



Appendix D. 9: Key Area PL-1 LPI/DPC Objectives

DPC Objectives for Plant Community Composition	Species Composition PL-1	
Grasses 50-64% Composition	threeawn - 22% James’ galleta (PLJA) - 11%	
	Total - 33%	
Forbs 0-9% Composition	Annual Forb – 22%	
	Total – 22%	
Shrubs 36-41% Composition	broom snakeweed – 33% rubber rabbitbrush – 11%	
	Total – 44%	
PL-1: Mudstone/Sandstone Hills 6-10” p.z. (R035XB201AZ)		
DPC Objective	Desired Range	Monitoring Data
Composition of Grasses	50-64%	33%
Composition of Forbs	0-9%	22%
Composition of Shrubs	36-41%	44%
Bare Ground	20-40%	12%
Canopy Cover	10-31%	18%
Basal Cover	4-10%	4%
Litter Cover	0-40%	14%

Species Composition Based on LPI at PL-1



Appendix E: Special Status Species, Threatened and Endangered Species, General Wildlife

Appendix E. 1: Federally Listed Species

Federally Listed Species		
Species	Federal Status	Habitat and status within the Evaluation Area
California condor <i>Gymnogyps californianus</i>	Endangered, Experimental population, non- essential (10j)	Reintroduced condors have been tracked and monitored in northern Arizona, southeast Nevada, north to Minersville, Utah; and east to Mesa Verde, Colorado and the Four Corners region. Condors in Arizona currently spend most of their perching, roosting, and foraging time in locations including the South Rim of Grand Canyon National Park, Navajo Bridge, and Vermilion Cliffs National Monument. Steep terrain with cliffs, caves, and outcroppings in open grasslands in Great Basin and Mohave Desertscrub at 2,000-6,500'. The AZ populations are considered Non-essential Experimental (10j), with range including northern Arizona north of I-40. There is no critical habitat within the state of Arizona. There are no condor release sites, known nesting sites, or communal roost sites in the project area; however, suitable foraging habitat is present. Due to the species' wide-ranging movements while foraging, it is likely that birds may be occasionally present in the Evaluation Area.
Yellow-billed cuckoo <i>Coccyzus americanus</i>	Threatened, (Western Distinct Population Segment)	The western yellow-billed cuckoo nests in low to moderate elevation (usually below 6,600 feet) riparian woodlands with native broadleaf trees and shrubs that are 50 acres or more in extent. They are strongly associated with cottonwood/willow-dominated vegetation cover, but composition of dominant riparian vegetation can vary across range. Uses a wider array of forest and shrub habitats during migration but is rarely observed away from riparian habitats. They nest in large blocks of riparian (e.g., cottonwood and willow galleries), oak woodland, and mesquite bosque at <6,600 feet. It is very unlikely cuckoo occur within the Evaluation Area and there is not suitable nesting habitat available to support this species.
Mexican Gray wolf <i>Canis lupus</i>	Proposed, experimental non- essential population	Wolves are found in areas with sufficient prey populations, such as deer and elk, and where human-induced mortality is controlled. Current populations of Mexican gray wolves in Arizona are typically associated with evergreen pine-oak woodlands, pinyon juniper woodlands, and mixed-conifer montane forests. The Mexican Wolf Experimental Population Area encompasses Arizona and New Mexico from Interstate 40 south to Mexico. Known pack ranges tracked by the Mexican Wolf Recovery Program show occupation of the Apache National Forest, Apache-Sitgreaves National Forests, and Fort Apache Reservation which are adjacent to the project area. The nearest allotment boundary is Roughly 35 miles from occupied wolf range south of I-40 (MWIFT 2021). There are no established packs in the area and the allotments do not provide quality wolf habitat. The USFWS issued a letter of concurrence (USDI USFWS 2012) for the determination of "may affect, not likely to adversely affect" regarding the Gila District Grazing Program's actions. <u>Conservation measures will continue to be followed and implemented.</u>

Northern Mexican gartersnake <i>Thamnophis eques megalops</i>	Threatened	Species is a riparian obligate. Lotic and lentic habitats that include ciénegas and stock tanks (earthen impoundments), and rivers containing pools and backwaters. Most frequently found between 3,000 and 5,000 feet but may occur up to approximately 8,500 feet. Northern Mexican gartersnakes use adjacent terrestrial habitats for foraging, thermoregulation, gestation, shelter, immigration, emigration, and brumation. They are found in areas of high native prey (fish and leopard frogs) concentration. There is no suitable habitat for this species in the Evaluation Area.
Zuni bluehead sucker <i>Catostomus discobolus yarrowi</i>	Endangered	Stream habitat in the headwaters of the Zuni drainage in New Mexico and Kinlichee Creek and its tributaries in Apache County, Arizona and Cibola, McKinley, and San Juan counties, New Mexico. No perennial streams or other suitable riparian habitat exists on the Evaluation Area.
Little Colorado spinedace <i>Lepidomeda vittata</i>	Threatened	Typically found in shallow, slow- to moderate-moving waters over fine sand/gravel bottoms. It may also occur within open pools that have undercut banks, logs, or boulders for cover. In Arizona, the most recent distribution information indicates that the current range is confined to isolated locations within the East Clear Creek, Chevelon Creek, Silver Creek, and upper Little Colorado River watersheds. No perennial streams or other suitable riparian habitat exists on the Evaluation Area.
Peebles Navajo cactus <i>Pediocactus peeblesianus ssp.</i>	Endangered	<p>A narrow endemic species with specialized soil requirements within low hills in the Plains and Great Basin Grassland biotic community. It requires cold winters; moist, cool springs; summer dormancy; and drying-out periods and grows in grows in exposed, sunny gravelly soils. Known from two main populations in Navajo County near Holbrook and Joseph City, Arizona. Known to be present in the Tanner Wash ACEC near Joseph City. Species is present within the Pipeline Allotment. Some suitable habitat exists within the other allotments, but occupancy has not been confirmed to date. The Gila District Grazing BO (USDI USFWS 2012) determined the Gila Districts grazing activities May Affect and are Likely to Adversely Affect Peebles Navajo Cactus under following conditions relevant to the allotments considered in this LHE.</p> <ul style="list-style-type: none"> a. All known Peebles Navajo cacti on BLM lands are excluded from livestock grazing activities. b. The BLM is committed to avoiding impacts to known populations of Peebles Navajo cactus in their livestock management program, including removing livestock from exclosures.
Monarch butterfly <i>Danaus plexippus</i>	Candidate	<p>Adult monarch butterflies require a diversity of blooming nectar resources which they feed on throughout their migration routes and breeding grounds from spring to fall (USFWS 2020). Monarchs require milkweed embedded within diverse nectaring habitat for ovipositing and larval feeding (USFWS 2020). There is poor monarch habitat on the allotments and though the species may disperse through the area. WF-05: It is BLM policy to manage federal candidate species and their habitat to prevent the need for listing as threatened or endangered. [Phoenix] RMP page 15.</p> <p>Consultation or Conference is not required under BLM Policy unless project actions jeopardize the species; however, Technical Assistance may be requested by BLM (6840.1F12f).</p>

Little Colorado sucker <i>Catostomus sp. 3</i>	Candidate, conservation agreement	The Little Colorado sucker inhabits the rocky pools and riffles of creeks as well as small to medium rivers and impoundments (Page and Burr 2011). There are no perennial streams or riparian habitat on the allotments to support this species. No potential for species occurrence. Candidate species under the ESA are treated as BLM Sensitive species. Consultation or Conference is not required under BLM Policy unless project actions jeopardize the species; however, Technical Assistance may be requested by BLM (6840.1F12f).
Black-footed ferret <i>Mustela nigripes</i>	Endangered	The black-footed ferret relies solely on native grasslands and the presence of prairie dogs for their prey source and for providing burrows to use for shelter and nesting. The BLM-administered portions of the Evaluation Area provide suitable grassland habitat to support this species; however, no prairie dogs are known to occur within the allotment. Due to the absence of the key prey source this species is expected to be absent from the allotment.

^a IPaC report, retrieved May 5th, 2022 (USDI USFWS N.d.)

^b AZGFD Report, retrieved May 9th, 2022 (AZGFD N.d.)

Appendix E. 2: Migratory Birds & Birds of Conservation Concern

Migratory Birds & Birds of Conservation Concern ^{1,2}	
Species	Comments
Brewer's sparrow <i>Spizella breweri</i>	Depend almost exclusively on shrublands for breeding, most commonly in sagebrush habitat. Some individuals will also use large clearings in pinyon-juniper woodlands, which share similar vegetation with the traditional sagebrush steppe community. Moderate potential for species to occur.
Chestnut-collared longspur <i>Calcarius ornatus</i>	Found in shortgrass prairies, rangelands, and desert grasslands. Eastern Arizona contains wintering habitat for this species. The allotments in the Evaluation Area provides a minimal amount of potentially suitable wintering habitat to support this species. Low potential for this species to occur.
Swainson's hawk <i>Buteo swainsoni</i>	Swainson's hawks breed in Arizona in habitats with scattered trees within grasslands, shrubland, or agricultural landscapes. There is some potential for this species to forage and perch in the allotments, though there isn't much suitable nesting habitat in the evaluation area. Low to moderate potential of species occurrence.
Common nighthawk <i>Chordeiles minor</i>	Breeding habitat includes prairies and plains, sagebrush and grassland habitat, open forests, and rock outcrops. The Evaluation Area are within the breeding range of this species and contain suitable habitat. Moderate potential of species occurrence.
Bald eagle <i>Haliaeetus leucocephalus</i>	The allotments fall within bald eagle non-breeding range. In the winter, eagles may be present foraging in the allotments where they may be drawn to calving afterbirth or other feeding opportunities. Bald eagles are regularly found along the Little Colorado River near the Evaluation Area. Low to moderate potential of species occurrence.

¹The migratory birds species listed are species of particular conservation concern (e.g. Birds of Conservation Concern) that may occur on or near the allotment. It is not a list of every bird species that may be found in this location, nor a guarantee that all of the bird species on this list will be found on or near this location. This list was compiled from data provided for multiple allotments in the region, including this allotment.

² Habitat information and determinations compiled from species profiles found on USFWS website. <https://ecos.fws.gov>

Migratory Birds & Birds of Conservation Concern ^{1,2}	
Golden eagle <i>Aquila chrysaetos</i>	Addressed as BLM Sensitive Species in table below.
Gray flycatcher <i>Empidonax wrightii</i>	Gray flycatchers are found in open woodlands, shrub-steppe, and the interface between these habitats in semi-arid climates. In shrub-steppe, most common where big sagebrush (<i>Artemisia tridentata</i>) grows to near tree height and in dry washes or valleys as opposed to terraces and ridges (Downes 2006, Altman & Woodruff 2012).
Lincoln's sparrow <i>Melospiza lincolnii</i>	The allotments within the Evaluation Area fall within Lincoln's sparrow migration (non-breeding) range. During migration, these sparrows use lowland, shrub-dominated habitats that provide cover such as riparian sites. Moderate potential for species occurrence on the Evaluation Area.
Sage thrasher <i>Oreoscoptes montanus</i>	Navajo and Apache counties overlap both the breeding and migration range of sage thrashers. These thrashers are considered sagebrush obligate, but are also found in black greasewood sites in Nevada and Utah (Braun et al. 1976a). Moderate potential for species occurrence.
Pinyon jay <i>Gymnorhinus cyanocephalus</i>	Addressed as BLM Sensitive Species in table below.
Juniper titmouse <i>Baeolophus ridgwayi</i>	In the southwestern U.S., pinyon-juniper woodland may be mixed with deciduous or evergreen oaks. Juniper Titmouse uses oaks in this region (Marshall 1957c, Gaddis 1987). There is very little juniper (or other trees) on the allotments within the Evaluation Area. Juniper titmice may disperse through the allotments, but adequate nesting habitat is not present. Low potential of occurrence.
Red-naped sapsucker <i>Sphyrapicus nuchalis</i>	Depend on forested habitats (i.e. aspen, pine, fir) for nesting and foraging. Habitat does not occur on the allotments. Low potential of occurrence.
Western burrowing owl <i>Athene cunicularia hypugaea</i>	Addressed as BLM Sensitive Species in table below.

Appendix E. 3: BLM Sensitive Species

BLM Sensitive Species	
Amphibians	
Arizona Toad <i>Anaxyrus microscaphus</i>	There is no perennial water or suitable aquatic habitat exist on the allotments. Low potential of occurrence.
Birds	
Western Burrowing owl <i>Athene cunicularia hypugaea</i>	Western burrowing owl depend on burrows built by mammals, tortoise, or artificially constructed for nesting and survival. They are found in arid and semi-arid grasslands or farmlands with and abundance of rodent and reptile prey. Some portions of the allotments provide adequate habitat thus, there is a moderate potential for this species to occur in the Evaluation Area.
Ferruginous hawk <i>Buteo regalis</i>	Ferruginous hawk nest in grasslands, sagebrush, shrublands, and forest edges in the northwestern United States. Species is likely present during migration though not expected to breed in the Evaluation Area.
Golden eagle <i>Aquila chrysaetos</i>	There is some suitable nesting habitat for golden eagles on the allotments in the forms of mesas. Golden eagles may also fly, forage, and hunt over the areas of the Evaluation Area. Low to moderate potential of species occurrence.

BLM Sensitive Species	
Northern Goshawk <i>Accipiter gentilis</i>	Northern goshawks inhabit pine forests of mountains regions of the southwest. This habitat does not exist in the Evaluation Area. No potential of species occurrence.
Pinyon jay <i>Gymnorhinus cyanocephalus</i>	Pinyon jay occurs in pinyon-juniper woodland. There are only a few scattered junipers throughout the Evaluation Area; This species is known to travel vast distances in response to localized abundance or shortages of forage. Therefore, there is a low likelihood of species occurrence.
Fish	
Little Colorado Sucker <i>Catostomus sp. 3</i>	The Little Colorado Sucker inhabits the rocky pools and riffles of creeks as well as small to medium rivers and impoundments (Page and Burr 2011). There are no perennial streams or riparian habitat in the Evaluation Area to support this species. No potential for species occurrence.
Invertebrates	
Succineid snails, all species in the family	No perennial water or suitable aquatic habitat exist in the Evaluation Area.
Mammals	
Arizona myotis <i>Myotis occultus</i>	Arizona myotis occurs in ponderosa pine and oak-pine woodlands near water. Little of this habitat exists in the Evaluation Area. The species will not be impacted.
Gunnison's prairie dog <i>Cynomys gunnisoni</i>	Gunnison's prairie dog are not known to be present in the Evaluation Area, however suitable habitat does exist and may be colonized if the species becomes more abundant in the surrounding area.
Spotted bat <i>Euderma maculatum</i>	Spotted bats inhabits desert scrub and open forests and are always associated with a water source such as springs, streams, or lakes. Little to none of this habitat occurs on the Evaluation Area, low potential for species occurrence.
Townsend's big-eared bat <i>Corynorhinus townsendii pallascens</i>	This species occurs in pine forests and arid desert scrub, always near caves or other roosting sites. Little of this habitat occurs in the Evaluation Area though it is possible for this species to occur.
Banner-tailed kangaroo rat <i>Dipodomys spectabilis</i>	The banner-tailed kangaroo rat is found in the southwestern United States and Mexico in limited numbers. They depend on open grassland with less than 20% shrub cover (cite Meriam's kangaroo rats are likely present in the Evaluation Area but banner-tailed are very rare in northern Arizona. In Arizona, Banner-tailed kangaroo rats are mostly found on the Buenos Aires National Wildlife Refuge and around Portal. Very low potential of occurrence
Reptiles	
There are no BLM sensitive reptiles known to occur in the Evaluation Area.	
Plants	
Roundleaf Errazurizia <i>Errazurizia rotundata</i>	Very localized species, known only from two small areas on creeks flowing to the Little Colorado River in Coconino and Navajo counties, Arizona. Species is found between elevations of 4,500 and 5,000 ft. on rimrock and cliff ledges, on red or white sandstone, sometimes engulfed in drift-sand. This species was historically documented in the Evaluation Area but is thought to be extirpated from the Evaluation Area.

Source: AZGFD Report, retrieved May 09, 2022 (AZGFD N.d.)

Appendix E. 4: Species of Economic and Recreational Importance

Species of Economic and Recreational Importance	
Common Name	Scientific Name
America pronghorn	<i>Antilocapra americana</i>
Elk	<i>Cervus elaphus</i>
Mule deer	<i>Odocoileus hemionus</i>
Mountain Lion	<i>Puma concolor</i>
Mourning dove	<i>Zenaida macroura</i>
Scaled quail	<i>Callipepla squamata</i>

Source: AZGFD Report, retrieved May 09, 2022 (AZGFD N.d.)

Appendix F: Comments from Interested Publics

Appendix F. 1: Comments from WWP



Arizona Office
738 N 5th Ave, Suite 206
Tucson, AZ 85705
tel: (520) 272-2454
fax: (208) 475-4702
email: arizona@westernwatersheds.org
web site: www.westernwatersheds.org

Working to protect and restore Western Watersheds and Wildlife

February 1, 2022

Submitted this date via email to:
Scott Cooke
Amelia Taylor

CCC Comments on 8 Allotments in the Safford Field Office

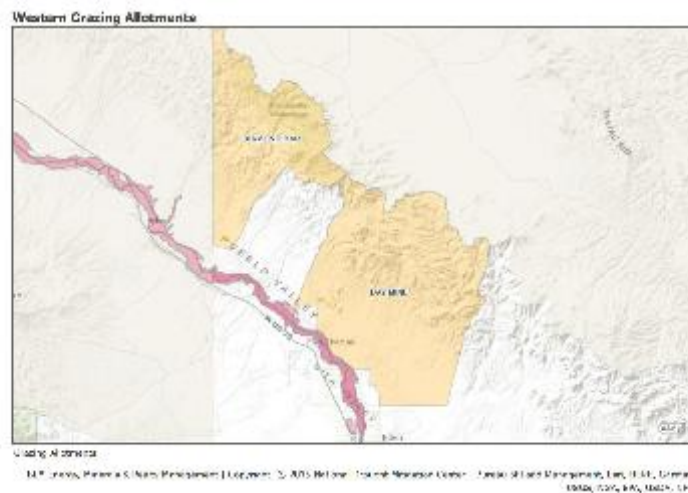
The following comments are in response to the notice of Public Consultation, Cooperation, and Coordination letter regarding the Safford Field Office's plan to reauthorize livestock grazing on eight allotments. Specifically, the Flying Butte (06074), Marcou Mesa (06127), Marcou Mesa East (01695), Manila Wash (06017), Mesa Wash (06172), Pipeline (06149), Diamond Bar (46010), and Day Mine (46040). Our comments will address the allotments in two groups – the six allotments near Winslow (the “northern group”), AZ and the two allotments near Safford, AZ (the “southern group”).

First, we noticed the CCC letter states that the potential impacts of livestock grazing on the environment have been analyzed previously through Environmental Impact Statements and the development of the Resource Management Plan. This is not accurate. While the generalized idea of livestock impacts on the environment may have been mentioned in previous NEPA documents, the specific impacts of livestock grazing on these allotments to the natural resources occurring in these specific areas have not been analyzed. Additionally, for the northern group only the Pipeline and Manila Wash have had any relatively recent NEPA analysis to authorize livestock grazing while the rest of the allotments in the northern group have had permits renewed twice without any NEPA analysis at all. Both of the southern group allotments have had permits renewed twice without any NEPA analysis. This means the majority of these allotments have had livestock use for at least two decades without any site-specific NEPA analysis to determine the impacts of grazing on natural resources. Therefore, the Bureau must conduct site-specific NEPA analysis prior to authorizing livestock grazing on any of these allotments.

Please disclose whether or not the permittee for each of these allotments has the required base water or property for the permit.

Both the northern and southern areas are not well suited for livestock grazing and considering permit retirement should be considered for each allotment. The impacts of climate change, drought, energy development, and growing residential and commercial development (and the associated groundwater pumping) must be considered as part of the cumulative impacts analysis prior to authorizing livestock grazing on these allotments.

There is critical habitat for the razorback sucker, southwestern willow flycatcher, and the yellow-billed cuckoo either within, adjacent, or within the watershed of both southern group allotments. The Bureau must carefully consider the impacts of livestock grazing on these species.



The northern group of allotments is near the Little Colorado River, which itself is important habitat for myriad species in the area and which is heavily stressed from contaminant runoff, mining activities, e. coli, groundwater withdrawals, drought, climate change, and heavy recreational uses. The Bureau must disclose how livestock grazing will contribute to the degradation of the river, the habitat for any special status species, and recreational experiences and safety.